

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Frame relay standouts

Buyer's Guide finds differences in otherwise look-alike services.
Page 51.

In-Site

Mass. puts Web behind the wheel



Mass. RMV's Director of IS
Larry McConnell

By Joanie Wexler
Boston

"Ringgg! Ringgg! Ringgg!!"

You finally give up trying to get a real person to answer the phone at the Registry of Motor Vehicles (RMV). You schlepp down to one of the RMV's branch offices and elbow your way through throngs of short-fused people standing in lines that snake around the huge room. After you have waited half the afternoon to find out how to get your car registered, the deadpan figure behind the desk informs you that, oops, you have been in the eye exam queue all along.

Motor vehicle registries are notorious for their frustrating customer service, but those character-building trips to the RMV may be approaching obsolescence, thanks to the Internet. And

See DMV, page 14

Intranets

Microsoft grand slam?

Company intranet-enables Office, Exchange and NT.

By Carol Sliwa
San Jose, Calif.

Microsoft Corp. was slow to catch the Internet train, but the Redmond, Wash., software giant went out of its way last week to let the world know that it's on-board.

Trekking here, Microsoft staged its third Internet briefing in six months, concentrating this time on the burgeoning intranet market. The company previewed a slew of products that could be used in private Webs, including new versions of Internet Explorer, Office, Windows NT and Visual Basic.

"In most cases, the audience went in with the idea that Microsoft was a bit behind," said Rob Enderle, a senior industry analyst for Giga Information Group, referring to the many chief information officers in atten-

THE INTRANET ROAD MAP

Microsoft highlighted the following:

- ▶ Office 97, which includes Outlook, an application for managing E-mail and files
- ▶ Internet Explorer 4.0
- ▶ Windows NT 4.0, bundled with FrontPage HTML authoring and Web site management tools as well as the Tripoli search engine
- ▶ Java development tool Visual J++, previously known as Jakarta
- ▶ Viper, server software with transaction monitoring and object request broker functionality

dance. "If anything, they came out with the idea that Microsoft was probably substantially ahead."

Microsoft's approach to intranets affords users significant advantages for accessing data, See Microsoft, page 83

Court restores 'Net freedom

By Network World staff

It is once again OK to get a little frisky on the 'Net.

Last week, a U.S. Court of Appeals overturned the Communications Decency Act (CDA), which threatened both jail and financial penalties for distributing "indecent" material over the Web.

The decision removes, at least for now, the possibility that unwitting corporations would be punished for the postings of employees. The bill's sponsor, Sen. James Exon (D-Neb.), expects the Supreme



Goldco's Chuck Kluko can avoid the censorship issue for now.

Court to ultimately decide whether the law stands. The Justice Department, however, has not decided if it will appeal the decision.

The overturn also means that network managers cannot simply depend upon the government to prune out inappropriate content. If corporations want to keep employees on the Inter-

See CDA, page 83

Sun lawyers fight for Java

Java-like domain names a no-no, Sun letters say.

By Chris Nerney

D. Javan Keith runs an electronics store in Nashville that his father started in 1972 when he formed Javan Enterprises, Inc.

Like any smart business owner in the '90s, Keith has kept up with the times. He does a brisk business selling computers and parts, provides local Internet access and has put up a Web site (www.javanco.com) to peddle his products.

Javanco — the Javan Enterprises store on 12th Avenue — is well known in the Nashville area,

and its name has been a trademark since at least 1982.

So imagine Keith's surprise when he received a letter in mid-May from a law firm representing Sun Microsystems, Inc. telling him to "promptly cease use of the 'javanco.com' domain name and promptly change its name from JAVANCO to a name that does not include any JAVA trademarks."

But Keith is not alone. In recent months,

Sun attorneys, through certified letters and electronic mail, have been quietly but aggressively "asking" numerous businesses and individuals with Web sites to drop the word "java" from their domain names. Sun claims these names violate the Java trademark the company registered last year for its set of Internet applications.

Sun isn't the only Internet-related megacorporation trying to carve out broad trademark rights.

Netscape Communications Corp. reportedly is ready to use its legal muscle to prevent other companies from using the suffix "scape" in their names.

While Keith may have been surprised by the letter from Fen-

See Java, page 84

EMPLOYEES FREE TO ROAM THE INTERNET

Question: Does your corporation block access to certain areas of the Internet?



Based on a survey of 119 Fortune 1,000 CIOs.

SOURCE: GORDON & GLICKSON P.C.

AT&T gripes while rivals rush to local loop

By David Rohde

Washington, D.C.

While AT&T officials are loudly demanding big resale discounts and strict interconnection terms with regional Bell operating companies, this approach may not get AT&T into the local market any time soon.

To the carrier's chagrin, the cable TV companies and MFS Communications Company, Inc.

are quietly accepting much looser terms in hopes of breaking into the market right away.

Such a yawning gulf has opened up between AT&T and other potential new local carriers over what to demand from RBOCs that the smaller carriers may end up giving users their first chance to cut their RBOC apronstrings.

See AT&T, page 84

Dig deeper on Network World Fusion. Resources include:

- ▶ Documents on local number portability
- ▶ A paper on interconnection requirements
- ▶ FCC draft orders on local-loop competition

Select News then Front Page.

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all your network servers, it saves you a lot more than just shoe leather.

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when you're away from the office. All you need is your notebook and a phone line.

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This Week



News+

The Front Page

- **Internet:** Read the judges' decision in the recent Communications Decency Act case, and link to Web sites on both sides of the issue.
- **Java:** See the Web sites that are getting Sun all worked up because of their use of the word "java."
- **The local loop:** Download articles on the economic ramifications of letting long-distance carriers and RBOCs compete directly.
- **Intranets:** Download dueling intranet white papers from Microsoft and Netscape.

The Technical Sections

- **Internet telephony:** Reach out and touch someone on the Internet with free and shareware software for making telephone calls over TCP/IP nets — and read up on the controversy over regulation of such calls — in Intranets & the 'Net.
- **Backup software:** Download vendor white papers on effective backup strategies for network servers, in Local Networks.
- **SMTP E-mail:** Read about new Internet E-mail and directory specifications, and download demo copies of TCP/IP-based E-mail clients, in Client/Server Applications.



NetRef

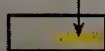
- After you read our frame relay services Buyer's Guide this week, download a listing of the different guarantees offered by providers, in Buyer's Guides and Reviews.

this week's pick

Isochronous Ethernet lets you run Ethernet and ISDN traffic over the same wires. Read more about it on Dave Hawley's IsoEthernet Page at <http://members.aol.com/dhawley/isoenet.html>.

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on First Visit and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an on-line registration form.



CONFERENCE PICK

HOT TOPIC

Read Briere and Heckart on carrier billing this week, then add your voice.

Select Forum, Columnists then Briere and Heckart.

NetworkWorld

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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

News briefs, June 17, 1996

My network is bigger than your network

■ Carriers continued to play leapfrog with announcements of network capacity: Sprint Corp. said it has deployed 16-channel wavelength-division multiplexing (WDM) technology along a 200-mile route in the Midwest. WDM allows an order-of-magnitude increase in traffic by beaming light signals at separate wavelengths over an existing fiber facility. MCI Communications Corp. last month announced installation of four-channel WDM technology along certain network routes.

Cabletron readies wider Spectrum

■ Cabletron Systems, Inc. this week will announce it is reselling application and system management products from BMC Software, Inc. and Metrix S.A., respectively. Cabletron will also disclose a phased integration strategy involving its Spectrum management platform and BMC's Patrol application. The moves are designed to bolster Spectrum's application, system and network management capabilities, sources said. Cabletron declined comment.

Better to be safe

■ Xylan Corp. last week announced it will partner with CheckPoint Software Technologies, Ltd. to integrate firewall products into its LAN switches. This should help customers to safeguard against unauthorized access to their virtual LANs. Earlier this month, Bay Networks, Inc. entered into a similar agreement with CheckPoint.

Healthy outlook for Netscape

■ Netscape Communications Corp. is in the throes of planning an initiative called Healthscape to promote medical services over the Internet, according to sources close to the company. Jim Clark, Netscape's chairman, has been involved in discussions with a number of medical establishments, including the Cleveland Clinic Foundation in Ohio, regarding the initiative. Clark is expected to reveal details of the plan this week.



Netscape's Clark

Microsoft goes eShopping

■ Microsoft Corp. has signed a deal to acquire eShop, Inc. and will incorporate its Internet merchandising software into Microsoft Merchant by year-end. Little-known eShop, a 35-person company based in San Mateo, Calif., operates an Internet shopping mall called eShop Plaza, and is the developer of eShop Technology, which merchants and electronic shopping center operators can use to build online commerce operations. The software now runs on Unix, but is being ported to Windows NT as well.

Bulking up BackOffice

■ Baan Co., Microsoft Corp. and Compaq Computer Corp. next week will announce a joint venture to put a version of Baan's Enterprise Resource Planning (ERP) system, dubbed Triton, on Microsoft BackOffice, according to sources in Europe. Likely to be billed as Dynamic Enterprise Modeling, the software is Baan's Triton client/server business applications rewritten for Windows NT and aimed at small and midsize enterprises. Representatives of the three companies declined to comment.

Lotus to cast 'Net

■ Lotus Development Corp. will hold a briefing this week at PC Expo where it is expected to further detail its plans for marrying Notes to the Internet. Sources said the company plans to talk more about an object architecture that will modularize key pieces of Notes, such as replication and security, for use over the World-Wide Web. Lotus will also reportedly outline its support for Java within Notes, due in a release later this year. Analysts said they also expect to hear more about how Domino, the HyperText Transfer Protocol Server for Notes that recently entered beta, will fit within IBM's Web server offerings.



Flexi rigid about supporting ActiveX

Microsoft's OLE-based technology at the heart of FlexiInternational's 'Net strategy.

By John Cox
Shelton, Conn.

Financial software maker FlexiInternational Software, Inc. last week announced an Internet plan that could have been written by Microsoft.

The company is putting its efforts behind ActiveX, a Microsoft Corp. OLE-based technology for building Web applets.

The move is a measure of the vendor's confidence in both Microsoft key technologies, not just ActiveX, but its broad line of Internet applications development products.

The approach was not some sudden revelation. Flexi executives said their original decision five years ago — to create an object-oriented application architecture implemented with Microsoft's object tools and operating platforms — will let them adapt their suite of accounting applications quickly to the Internet.

"On paper, we don't see any limits [to the Microsoft architecture]," said James Schenck, executive vice president of software engineering for Flexi.

An old rival is convinced that Microsoft has a solid and compelling approach to the 'Net. "Anyone who is resisting the Microsoft architecture at this point is nuts," said John Landry, former chief technology officer for IBM's Lotus Development Corp. and a member of the Flexi board of directors.

Companies such as Flexi that have embraced Microsoft's Component Object Model (COM), which underlies ActiveX, and an object-oriented architecture will be able to easily follow Microsoft into the Internet application space, he said. But other developers will have to extensively rebuild their applications, Landry predicted.

Stefan Bothe, Flexi chief executive officer and cofounder, outlined the company's two-

phase Internet strategy. In the first phase, Flexi will create a set of HTML-based application extensions that will be downloadable from a Web server to a Web browser. This downloaded code will directly access Flexi server-based programs on either Windows NT or Unix servers.

These changes, due in just a few weeks, will let users query the Flexi application using a Web browser, Bothe said.

The second phase, which will be demonstrated by year-end and available early next year, will go much further. Because the Flexi applications, written in Microsoft Visual C++ and the Microsoft Foundation Classes, make use of COM and OLE controls (pieces of code now considered to be

ActiveX objects), Flexi's developers will be able to incorporate these into the ActiveX browser and server environments.

As a result, users can download ActiveX components to the Web browser where the components can handle local processing and application functions. Also, via Distributed COM (DCOM, formerly known as Distributed OLE), the components will interact with Flexi server-based objects.

That means the full breadth of application functions in today's LAN-based client/server networks will be available via the Internet/World-Wide Web.

DCOM, currently in beta test with the Beta 2 release of Windows NT 4.0, is essential to Microsoft's Internet strategy because DCOM is intended to let COM objects communicate over any combination of networks. ■



Flexi's Landry

Client/server messaging

Oracle InterOffice to debut

By Barb Cole
San Francisco

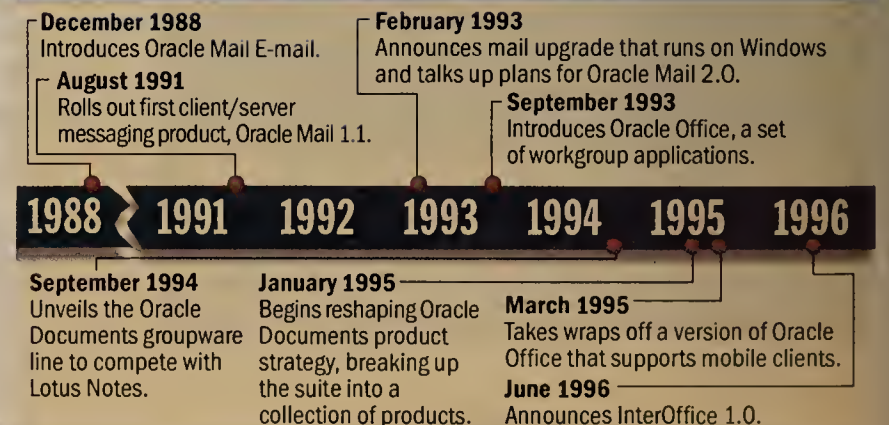
Despite several false starts in the client/server messaging space, Oracle Corp. could still beat some competitors to the punch with a Web-ready groupware offering.

The database giant this week will take the wraps off InterOffice 1.0, software that ties all the company's electronic mail,

directory, calendaring and scheduling, and document management technologies to Web servers and the Oracle7 database.

Missing will be a workflow component, which company officials said will ship later this year.

Several of Oracle's competitors, including Microsoft Corp.,
See Oracle, page 85

Oracle's messaging milestones**HOW TO REACH US**

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Apple makes Macintosh a better remote access player

By Tim Greene

New York

Apple Computer, Inc. is beefing up its remote access portfolio to make it easier for Macintosh users to call in to non-Apple central sites and the Internet.

The plan, being announced this week at PC Expo here, calls for support of PPP for connecting to TCP/IP networks. Later on, that capability will be expanded to include support of AppleTalk over PPP, as well.

"Demand for IP networking is being driven by the Internet, and Apple has to adopt it and make it work," said Ravi Rosju-Maharaj, Apple product manager for networking and communications.

IP networking will give users, such as the New York-based financial firm The Carson Group, better access to their non-Apple central sites — the Unix-based financial filings database, for example.

Now remote users can dial into a database updated monthly, but that will change with the planned Apple upgrade to support dialing into IP nets. Remote users will be able to tap a database on an IP net that is constantly being updated by the Securities and Exchange Commission, according to David Asofsky, a partner in the Carson Group.

The first step in the Apple remote access upgrade is the immediate release of Apple Remote Access (ARA) 2.1 software to support ISDN, either one or two B channels and a broad spectrum of widely used ISDN access hardware. Current ARA software supports only one B channel and hardware from very few ISDN vendors.

ARA 2.1, however, will not support multilink PPP, which permits dropping and adding B channels as needed.

ARA 2.1 comes in client and server versions; the server version supports incoming calls, in addition to outgoing.

The software also comes in a Multiport Server version, comprising software and a six-port PCI card; four ports accommodate two ISDN B channels and the other two ports support one.

Sometime this summer, Apple will release Open Transport/PPP, which will support IP over PPP. Open Transport tech-

nology, Apple's communications system, already provides a standard interface to several network protocols, including the X/Open Transport Interface, Portable Operating System Interface-compliant STREAMS and IPX/SPX.

Something in the ARA

By the first quarter of next year, Apple will release ARA 3.0, which will support IP and AppleTalk over PPP as well as Apple remote access protocol.

Apple's remote access game plan

- **Phase 1 (June 28)**
ARA 2.1 with ISDN support.
- **Phase 2 (Q3 '96)**
Open Transport/PPP, supporting PPP for dial-up access to TCP/IP networks.
- **Phase 3 (Q1 '97)**
ARA 3.0, supporting AppleTalk and TCP/IP over PPP. Also, Open Transport-Enhanced support for AppleTalk Remote Access Protocol.

ARA 3.0 will automatically sense the protocol being used at the receiving end and let ARA users connect with the appropriate protocol. Apple users will be able to call in to IP networks.

ARA 2.1 Client costs \$59; Personal Server costs \$189; and Multiport Server costs \$1,099. The pricing for the Open Transport/PPP and ARA 3.0 products has not yet been set. ■

IBM, AST put servers in spotlight

Pentium Pro-based clustering and Web servers on the way; DG and SCO pair up.

By Ben Heskett

New York

Intel Corp.'s Pentium Pro hardware will be twisted into many shapes at PC Expo here this week, showing up in everything from server clusters to Web servers.

On the high end, IBM will stand out by airing its server clustering strategy, while AST Research, Inc. will debut a Web server.

"The Intel architecture is now going to be extended even higher into the enterprise," said Jerry Sheridan, an analyst with Dataquest, Inc., a San Jose, Calif.-based consultancy.

IBM will make its entry into the PC server clustering market by offering Vinca Corp.'s StandbyServer failover software as an option with its servers, including the Pentium Pro-based 704. The software runs on Windows NT, NetWare and OS/2, and will come with an IBM 100M bit/sec Ethernet card for server-to-server connectivity.

IBM officials have said the StandbyServer option could be only one of many the company is designing to satisfy customers' thirst to cluster computers (NW, June 3, page 8).

The StandbyServer option will be available for the 320, 520 and 720 server lines by September. Testing for the Pentium Pro-based 704 is not yet complete, according to Vinca officials.



The product is priced at \$3,875.

Long-silent AST will also make noise at the show by rolling out the Manhattan S6200 server, which will be available with one or two 200-MHz Pentium Pro processors.

In addition, the company will announce a Web server bundle, called the Commerce Pro, that is based on the new servers.

AST is basing Commerce Pro on The Internet Factory's Merchant Builder Web server, SoftQuad, Inc.'s HotMetal Light Web page-creation and publishing software, and Software.com, Inc.'s Post Office mes-

saging software. By doing so, the company is not following the lead of the PC server giants, most of which are packaging Microsoft Corp. and Netscape Communications Corp. Web software with their servers.

AST is attempting to recover from a series of poor financial quarters that led to a management shake-up. Ian Diery, formerly with Apple Computer, Inc., has taken the reins as chief executive officer and promised to bring products to market ahead of competitors.

The S6200 starts at \$7,500; Commerce Pro starts at \$8,650.

Separately, Data General Corp. and The Santa Cruz Operation, Inc. last week announced an agreement to develop a version of SCO UnixWare that will run on Data General multiprocessor servers based on the company's nonuniform memory architecture (NUMA).

Data General will continue to

Putting the Pentium Pro to work

- **IBM and Vinca**
Will use Vinca's StandbyServer to link two 320, 520 or 720 IBM PC server models in a failover cluster. Support for the Pentium Pro-based 704 model is expected soon.
- **AST**
Will combine an array of software in an integrated Web server called Commerce PRO that runs on up to two 200-MHz Pentium Pro processors. The bundle is based on the new S6200 Pentium Pro server model.
- **Data General and SCO**
Support for Data General's NUMA technology will be included in the next version of SCO's UnixWare. NUMA allows for memory sharing across a network and the tying together of Pentium Pro quad-processor motherboards.

UUNET won't wait for high-speed 'Net access

By Tim Greene

Toronto

Hoping to beat phone companies to the punch, Internet carrier UUNET Technologies, Inc. is getting ready to trial T-1-speed Internet access here using low-cost ADSL technology.

If successful, UUNET may adopt the technique in the U.S., giving users high-speed Internet access at a fraction of the cost of an equivalent T-1 line.

For example, US WEST, Inc., one of the few domestic carriers aggressively pursuing the technology, predicts Asymmetric Digital Subscriber Line (ADSL) service will cost \$35 per month.

Rather than wait for local exchange carriers (LEC) to provision ADSL, UUNET for the trial will collocate its own ADSL-capable equipment at a Bell Canada central office switch.

All UUNET buys from the LEC is access to the local loop — a relatively inexpensive part of local access, according to Kieran

Grab more info on Network World Fusion, including:

- An ADSL primer
- TeleChoice's online ADSL report
- A look at Rate Adaptive DSL

Select News+ then WANs & Internetworking.

<http://www.nwfusion.com>

Taylor, broadband consultant with TeleChoice, Inc. a consultancy in Verona, N.J.

Regional Bell operating companies in the U.S. might like the

idea of selling local-loop access to Internet service providers (ISP) because it would demonstrate they are encouraging competition in the local loop without undermining existing RBOC services, Taylor said. Making access to RBOC facilities available to competitors will help RBOCs fulfill some of the requirements needed to gain permission to sell long-distance service.

In the test here, UUNET will lease the local loop from Media Light, Inc., a network research and development firm affiliated with Bell Canada.

The ADSL service will enable users to receive data at 1.5M bit/sec and send data at 64K bit/sec at distances up to 22,000 feet from the central office.

If successful, the trial would prove that ISPs can offer nearly ubiquitous broadband Internet

access without relying on LECs to buy into ADSL.

Limited U.S. ADSL trials by LECs are under way with just US WEST promising an ADSL Internet access service by year-end.

The trial will employ the FlexCap ADSL modem PC card — new user hardware from Westell, Inc. UUNET is negotiating with a large corporation to participate in the trial, which will be larger than any ongoing in the U.S., a UUNET spokesman said.

The FlexCap PC card configures itself with Windows NT server operating systems. Pricing has not been set.

In other ADSL developments, Telebit Corp. has been sending around letters reminding ADSL hardware vendors that it holds four patents related to the accepted industry standard for ADSL.

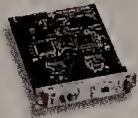
The letters could result in acceptance of a second standard developed by AT&T Paradyne. ■



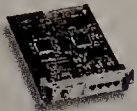
ADVANCESTACK HUBS AND SWITCHES



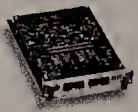
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100Base-T. High-performance switch to
switch or switch to server. Coming soon



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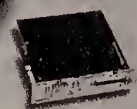


CISCO. Future router integration



ATM. Coming soon

SWITCH MODULES



Router 210. Connectivity to remote site

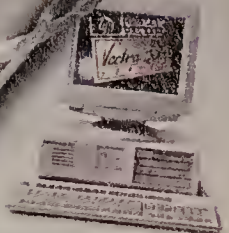


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MCI and BT to meld 'Net backbones

Concert customers to get local access to consolidate backbone, one bill worldwide.

By Joanie Wexler
Washington, D.C.

MCI Communications Corp. last week said it will unite its domestic Internet backbone with that of British Telecommunications plc to provide one-stop shopping for international 'Net services.

The carriers, under their Concert joint venture, beginning this summer will build 20 regional hubs to give customers local access to a common backbone and consolidated billing for access services worldwide. The dial and dedicated 'Net access services, called Concert InternetPlus, will be available in October.

Today, offshore sites of U.S.-based multinational companies must use costly private lines from Postal Telecommunications and Telegraph (PTT) authorities to access MCI's 'Net backbone in the U.S. This results in what Vint Cerf, MCI's senior vice president for data architectures, called a "hairy billiard ball" of commu-

nications lines circling the globe.

Steve Von Rump, vice president of data services marketing at MCI, said, "MCI international lines today are not efficient and not redundant." Local access to a 'Net point-of-presence will allow customer traffic quicker entry into a meshed network of diverse routes, leaving tail circuits shorter and traffic less vulnerable, he said.

MCI will also launch a premium 'Net service with guaranteed network throughput and availability levels aimed at corporate intranets, Von Rump said.

The carrier will let existing international MCI private-line customers change their contracts to take advantage of Concert InternetPlus, according to Farooq Hussain, MCI senior manager of Internet marketing.

The offshore regional links will run at 45M bit/sec and hook into MCI's 155M bit/sec U.S. backbone. The carriers will increase international capacity of

the Internet by about 30% via the network upgrades involved with rolling out the new services.

Hussain said the companies will also be mirroring heavily hit Web home pages on servers around the world to alleviate traffic bottlenecks.

All this is important to global companies relying on the Internet, such as Internet Tradeline, Inc., based in New York. The company hosts content for business-to-business electronic goods trading in approximately 10 countries. Included in the trading kit given to Tradeline customers is Internet access, today gleaned from the PTTs.

"We are looking for a big gorilla" to provide the international links, said Lenny Kutorsky, Tradeline's chief information officer. He said it is "easier and more cost-effective to make one deal" and that he expects more consistent customer support from a single vendor.

The international market for 'Net services has become a hotbed of activity. For example, UUNET Technologies, Inc. has been acquiring foreign 'Net service providers at a dizzying pace. Like Concert, UUNET will be offering unified billing, quality of service guarantees and international roaming services. ■



MCI's Cerf

MCI, Intel pave Internet path

MCI Communications Corp. and Intel Corp. last week announced they are teaming up to develop and market Internet offerings.

Their first joint product is a \$9,995 turnkey hardware and software package for companies that want to host their own Web servers.

The heart of the package, dubbed networkMCI WebMaker, is a 200-MHz Pentium Pro-based server from Intel that runs Windows NT. The server comes bundled with Netscape Communications Corp.'s Communication Server, a firewall, Web-site creation tools and a Cisco Systems, Inc. router card. MCI will provide the Internet access link, but monthly fees are not part of the networkMCI WebMaker price.

The companies are offering a lot for the money, said Eric Paulak, senior analyst at Gartner Group, Inc., a consulting firm in Stamford, Conn. The cost of building and hosting your own Web site by assembling all the components yourself typically runs from \$55,000 to about \$150,000, he said.

One shortcoming of any approach to hosting your own Web server, however, is that you do not take advantage of the economies of scale afforded by an outside hosting service, which can increase CPU and access capacity as needed.

But MCI and Intel hope to attract customers with an ever-increasing array of services, including those for multimedia delivery over the 'Net.

Frank Gill, executive vice president and general manager of Intel's Internet and communications group, said the companies are testing bandwidth-conserving technologies such as compression, IP Multicast and Resource Reservation Protocol, which can be used to carry multimedia traffic more efficiently. These technologies will likely turn up in intranet and remote access services early next year and support applications such as video electronic mail and corporate training on demand.

Contact MCI at (800) 503-7771.

—Joanie Wexler

Bell Atlantic goes flat out to offer flat rate ATM service

Carrier offers flat rates, eschewing mileage, usage charges.

By Tim Greene
Philadelphia

Bell Atlantic Corp. last week said it will tariff a flat-rate Asynchronous Transfer Mode service in six metropolitan areas by year-end, making it among the most aggressive RBOCs in pursuit of the ATM market.

The fact that the offering has no usage- or mileage-based charges should make it attractive to customers, observers said. The carrier, which until now offered and priced ATM services only on a case-by-case basis, is targeting users of telemedicine, Internet access and distance-learning applications.

Increased demand, plus the emergence of the User-to-Network interface (UNI) and other standards led the carrier to offer a more mainstream service, the company said.

The new service puts Bell Atlantic in a category with Pacific Bell and US WEST, Inc., as regional Bell operating companies offering tariffed ATM.

Mike O'Dell, vice president

and chief scientist at Internet access provider UUNET Technologies, Inc. in Fairfax, Va., said the pricing scheme should keep rates predictable and potentially

FLAT-RATE ATM

Bell Atlantic's ATM service will feature flat monthly fees. This means there will be no usage or mileage charges.

Physical connection	Bandwidth	Monthly cost
DS3	10M-45M bit/sec	\$3,000-\$4,200
OC-3c	25M-155M bit/sec	\$5,500-\$8,200 (SONET); \$3,800-\$6,500 (Direct fiber)

lower than those based on mileage and usage. He said his company is looking closely at the service and anticipates basing an Internet access service on it.

Steve Taylor, president of Distributed Networking Associates in Greensboro, N.C., said demand for this type of high-bandwidth service is increasing, particularly among companies that need to link sites within the same calling area.

Bell Atlantic will focus on Philadelphia, Pittsburgh, northern New Jersey, Baltimore, Wilmington, Del., and Washington, D.C. If demand warrants, the service will be extended to Norfolk and Richmond, Va.

The company regards ATM as complementary to frame relay and Switched Multimegabit Data Service fast-packet offerings, all of which will be interworked by mid-1997 using Cascade Communications Corp.'s ATM switches. This will let companies keep WAN links to small sites intact while they migrate hub sites to ATM.

The carrier is also exploring T-1 interworking with ATM service, enabling companies to upgrade where appropriate.

Bell Atlantic will not offer ATM voice services immediately. This means that customers wanting to link private branch exchanges over ATM, for example, would have to do so via T-1 circuit emulation over a private virtual circuit with a constant bit rate (CBR) quality of service.

Bell Atlantic plans to offer CBR and variable bit rate qualities of service. It is evaluating available bit rate and unspecified bit rate. ■

A B E N D

abend (n) 1: abnormal end to a computer process **2:** the online fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

Five Web sites we'd like to see

- 1. The virtual auto mechanic page.** Watch your car being worked on. Did it really take four hours? Did they really rebuild your whole braking system? And what was that they dropped in the carb?
- 2. The virtual car sales page.** A hotlink away from the virtual auto mechanic, this page lets you replace the old car your mechanic just destroyed. Take a test drive, hear from satisfied customers and run the galvanic truth meter on your salesperson. \$100 over invoice? Can't go any lower? BZZZZZZ!
- 3. The Windows installation page.** Watch end users fumble with adding RAM, CD-ROMs and those accursed sound cards. See them install new software, only to have it disable everything else. Hear them sputter "\$#&^! Irq*@(C& Hardware Interrupt." Page sponsored by Apple.
- 4. The Microsoft confession page.** On this page, executives admit MacOS is better than Windows, the Netscape browser beats out Explorer and that their company didn't invent GUIs, BASIC, groupware, multitasking or the 'Net.
- 5. The "I'm with you" page.** Simply input your beliefs on a particular issue and those of your opponent. This page will then take your side on any issue.

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Fastest. As in 256MB per second. That's the speed you'll get out of the processor-to-second-level cache.

Apple Network Servers don't run any old UNIX® operating system. They run IBM's reliable, industrial-strength AIX® operating system.

Hot feature. Two rear cooling fans are hot-swappable.

With support for both TCP/IP and AppleTalk® protocols, you get fast network speed when you have either PCs or Macintosh® systems (or both) connected. Of course, being Apple, we couldn't resist tuning AppleTalk for maximum speed.

Add a PCI RAID disk array card, and your Network Server supports up to six hot-swappable drive bays. So your server doesn't have to go down just because one of your drives does.

With a modular processor daughtercard, upgrading the microprocessor in your Network Server is a snap.

Each major component of the Network Server 700 can be accessed in about the time it takes to read just a few of these captions—60 seconds or less.

Add up to six PCI cards—Ethernet, FastEthernet, PCI RAID disk array (only four of these, sorry), or a wide array of third-party PCI cards—in the six (count them, six) open slots.

You can easily add third-party memory DIMMs, SCSI disk drives and tape drives to our Network Servers. We won't, however, refuse your hard-earned money if you prefer genuine Apple® components.

Not that we're saying you'll ever need it, but an optional, 7-day-a-week, 24-hour-a-day service plan is available. To learn about priority queuing, next-day on-site service and more, simply contact your Apple Premium Server Reseller.

You want your server just to sit there and work. But that doesn't mean it has to be ugly. Enter Apple industrial and ergonomic design. It means our servers don't just look good, they're easy to move, upgrade and service, too.

Vocabulary test: Apple Network Servers are binary-compatible with >10³ proven AIX apps, no recompiling or porting necessary.

You get free, "try before you buy" software, too: Helios and IPT software for OPI publishing and file and print sharing, Legato Networker software for backup and recovery, and APC software for uninterruptible power supply support.

Is there any such thing as too much disk space? A great way to find out is to plug in a MegaDrive Systems' RAID array with its whopping one terabyte of storage.

With a rated WebStone 1.1 benchmark performance of 12 megabits per second, the Apple Network Server 700 makes any other server look like a benchwarmer.* That's enough raw power to support eight T1 lines and millions of Internet connections a day.

Yes, there's a third, built-in, external SCSI port, perfect for adding up to seven more devices. Like the 20GB Digital Linear Tape (DLT) Drive from Quantum.

Start building the Network Server you need for under \$11,000.**

The mouse draws 10 mA. Pop quiz to follow.

Should it ever be necessary, replacing the logic board is as simple as unplugging the old one and plugging in the new.

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Except this.



DMV

Continued from page 1

the commonwealth of Massachusetts is blazing the trail.

The state's RMV agency has teamed with Internet service provider BBN Planet on a three-phase program to use Web technology to automate its processes. The goal of the project — which is about one-third complete — is to allow citizens to eventually pay car registration fees and conduct all other RMV transactions via the 'Net.

Building a Web site

The first phase of the online effort began quietly in March. That is when the RMV built a basic Web site that mooched capacity off the BBN Planet server already hosting the state's Office of Management

PUTTING AN END TO ALL THOSE LINES

The Massachusetts RMV online rollout schedule:

Phase 1 (completed in March):

Built Web site giving citizens access to general RMV information.

Phase 2 (begins in late June):

Enable citizens to pay traffic citations, renew registrations, order duplicate registrations and order vanity license plates.

Phase 3 (begins in the fall):

Allow individuals and other validated parties to access individuals' driving histories.

Possible future:

Give citizens direct access to the RMV mainframe to book driving exam appointments.

Information Systems (OMIS) site, explained Larry McConnell, the RMV's director of information services.

The RMV site was designed to give citizens a simple avenue for getting general information about RMV procedures and fees. In addition to reading posted information, users could ask questions via electronic mail that the registry committed to answering by the next business day.

With no publicity, the site immediately generated 50,000 hits a month, agency officials said. And the state has received over 200,000 E-mail requests so far, said Webmaster Brian Preble, an independent consultant working on the project. He has put those questions into a large frequently asked questions file scheduled for availability this summer.

"This stuff is long overdue," said George Baroud, a retired Easton, Mass., resident who used the RMV's Web page to find out the best way to return license plates and get a receipt. "It beats never getting through on the phone, or dialing into an [interactive voice response unit] and having to make a bunch of decisions."

Paying penalties online

Late this month, McConnell said, the \$50,000 project's second phase will get under way, enabling citizens to begin paying traffic citations via secured transactions over the 'Net. This will automate the

RMV's job of collecting \$45 million a year in statewide traffic fines and disbursing the money back to the towns where tickets were issued.

To handle all these and other transactions, the agency turned to BBN Planet, which is hosting a separate transaction-processing server for the agency.

"The biggest technical challenge was understanding how we could secure the transaction," McConnell said. "That's why we contracted with BBN."

BBN Planet's high-end hosting service option runs Netscape Communications Corp.'s Commerce Platform software on a Silicon Graphics, Inc. or Sun Microsystems, Inc. server dedicated to an individual customer. The RMV Web server shares a T-3 connection to the Internet with other BBN customers' servers.

Here's how the system works: End users access the RMV home page and click on a transaction, such as the citation processing area, which puts them into a secured mode in which all their data is encrypted using RSA Data Security, Inc. technology. The user information and credit card number are validated by BBN Planet based on parameters supplied by the RMV and through a credit card processing house. The information is then forwarded to an RMV mainframe database for processing. The database is updated, and users are notified by E-mail that a transaction is complete.

From there, payments are electronically disbursed back to the various Massachusetts city governments.

The third phase of the project, to begin this fall, will allow citizens and other select parties to access driving and auto insurance records, McConnell said. This information could be pertinent, for example, to trucking firms checking out a job applicant's background. But this capability will require that the RMV is convinced that users requesting data are who they say they are.

"Information can be encrypted, but I don't trust the origin of the message," McConnell said. So far, he does not perceive authentication software as "industrial-strength."

Over time, the electronic commerce functions will reduce the load on customer service representatives in the RMV's branches and main office.

McConnell figures that perhaps 10% of traffic violation citations paid by mail would initially be replaced with Web transactions.

Even though he has not done any cost-benefit analysis yet, events such as the one that took place last week provide all the justification McConnell needs.

Those who visited registry branches in Massachusetts last Monday were turned away because the RMV mainframe shut down due to a disk drive on another mainframe in the same room catching fire and leading to a power shut-off.

"If customers had been conducting an RMV transaction over the 'Net, they would not have been impacted," McConnell said. The reason is that the BBN server can store transactions and forward them to the mainframe once it is running again, he said. ■

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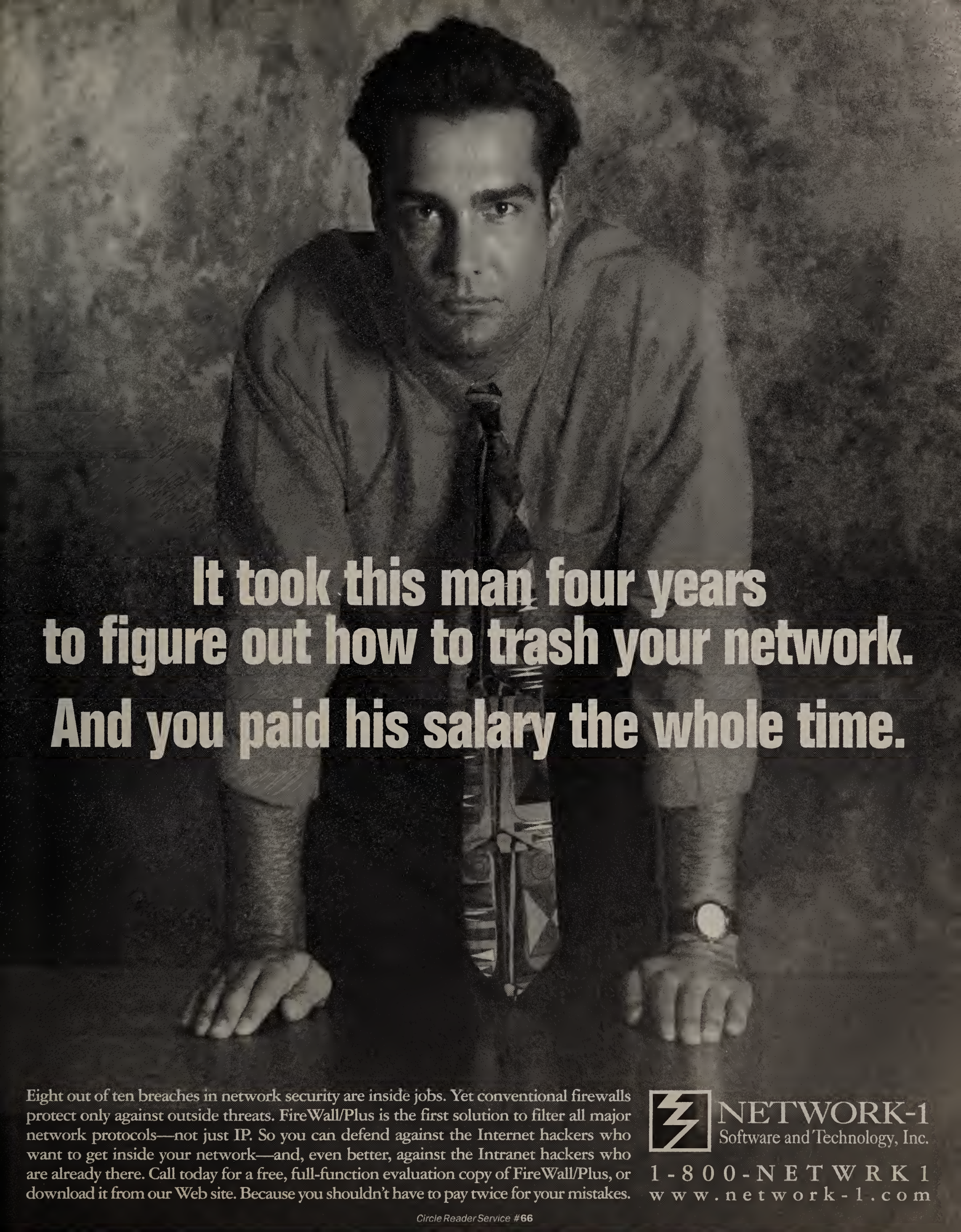
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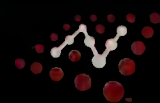
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platform.

IF YOU'VE ever seen a mobile home park after a tornado, then you know why they're called "mobile" homes. No matter how well built they might be, they lack a solid foundation and their owners consistently pay the price.

Pessimists' viewpoints aside, the Internet is not a mobile home.

It is securely fastened to a powerful, proven foundation of multivendor networks. In fact, the Internet and its intra-enterprise relatives, intranets, are simply LANs/WANs with browser functionality. This added functionality allows users easy access to a wealth of information—anything from graphics, documents and other resources available to the general public on the Internet to the private and secure information a company publishes on its corporate intranet. Both the Internet and intranets allow for ease in updating and accessing information quickly and economically.

As the leader in network technology, Novell is helping to anchor the Internet/intranets. Nearly 55 million people work on NetWare® networks, and more companies trust NetWare than all other network operating systems (NOSs) combined. Today, many enterprises are accessing cyberspace through NetWare and other core products from Novell and its partners. Novell and industry partners are helping IS departments evolve their networks into dynamic Internet/intranet solutions.



Photography—David Levinthal



Engineering Internet/intranet
solutions—The NetWare 4 platform.

Novell's primary long-term objective is to extend network and Internet technologies—to create pervasive networks that will easily allow access to the information, communications and electronic devices people need, anytime, anyplace. The foundation for a global grid of intelligent networks is in place right now, and it's made from a solid composite material: NetWare 4 networks and the powerful products that work with them.

Fundamental network building blocks: NetWare 4 and Novell Directory Services

Working behind the scenes in millions of organizations worldwide, NetWare 4 transparently provides many of the links and much of the intelligence for the Internet. With unparalleled services for file, print, directory, security, integrated messaging, multiprotocol routing, web serving and network management, NetWare 4 reliably and seamlessly connects organizations to their departments and branch offices, to suppliers and customers, and to the wired world at large.

Any mature technology ought to be easily managed. NetWare 4 is easily the most manageable Internet/intranet-capable NOS in the world. As networks continue to expand in size and functionality, Novell Directory Services™ (NDS™) becomes an increasingly vital component. It is a truly global directory service in contrast to the workgroup-based domains offered by other information technology companies. NDS enables NetWare 4 users to access all network resources with a single login. Also, management and administration utilities let IS personnel control network and Internet servers from a single point. NDS offers the

most cost-effective, labor-efficient way to manage today's networks while preparing for tomorrow's.

A good example is the recent restructuring at Intelsat, the world's leading provider of international satellite telecommunications. That firm recently made the decision to replace 62 Microsoft NT Server and LAN Manager servers with NetWare 4.1. According to Jet Guilaran, LAN Analyst with Intelsat, "NetWare 4.1 offered what NT and LAN Manager couldn't—a hierarchical directory service that provides a single, central point of network administration. And because of NetWare's performance capacity, we were able to consolidate our 62 Microsoft servers down to just 16 NetWare 4.1 servers."

From LANs/WANs to intranets in a single step: Novell InnerWeb Publisher

Imagine enabling everyone in your company to use the most recent version of a marketing memo or information on the company's health care plan regardless of which platform or word processor they were using. That's what corporate intranets are all about—using inexpensive Internet technologies to publish and distribute information. So what does it take to upgrade existing corporate networks with the power of the World Wide Web? Due to the recent release of Novell InnerWeb Publisher™, the answer is a single software suite and minimal effort. InnerWeb Publisher contains the following:

- NetWare Web Server™ 2.5, the world's fastest web server.
- Netscape Navigator 2.01, the world's most popular web browser.
- HoTMetaL Light, an HTML authoring tool for quickly creating effective web pages.

- IWare Lite, which enables IPX web access and obviates the need for TCP/IP stacks on every desktop for intranet connection.

- NetWare 4.1 Runtime™, the core NetWare 4 operating system for implementing NetWare Web Server on a dedicated runtime server.

InnerWeb Publisher is cost-effective and convenient. It provides all of the benefits of internal web publishing, while preserving corporate investments in hardware, software and training.

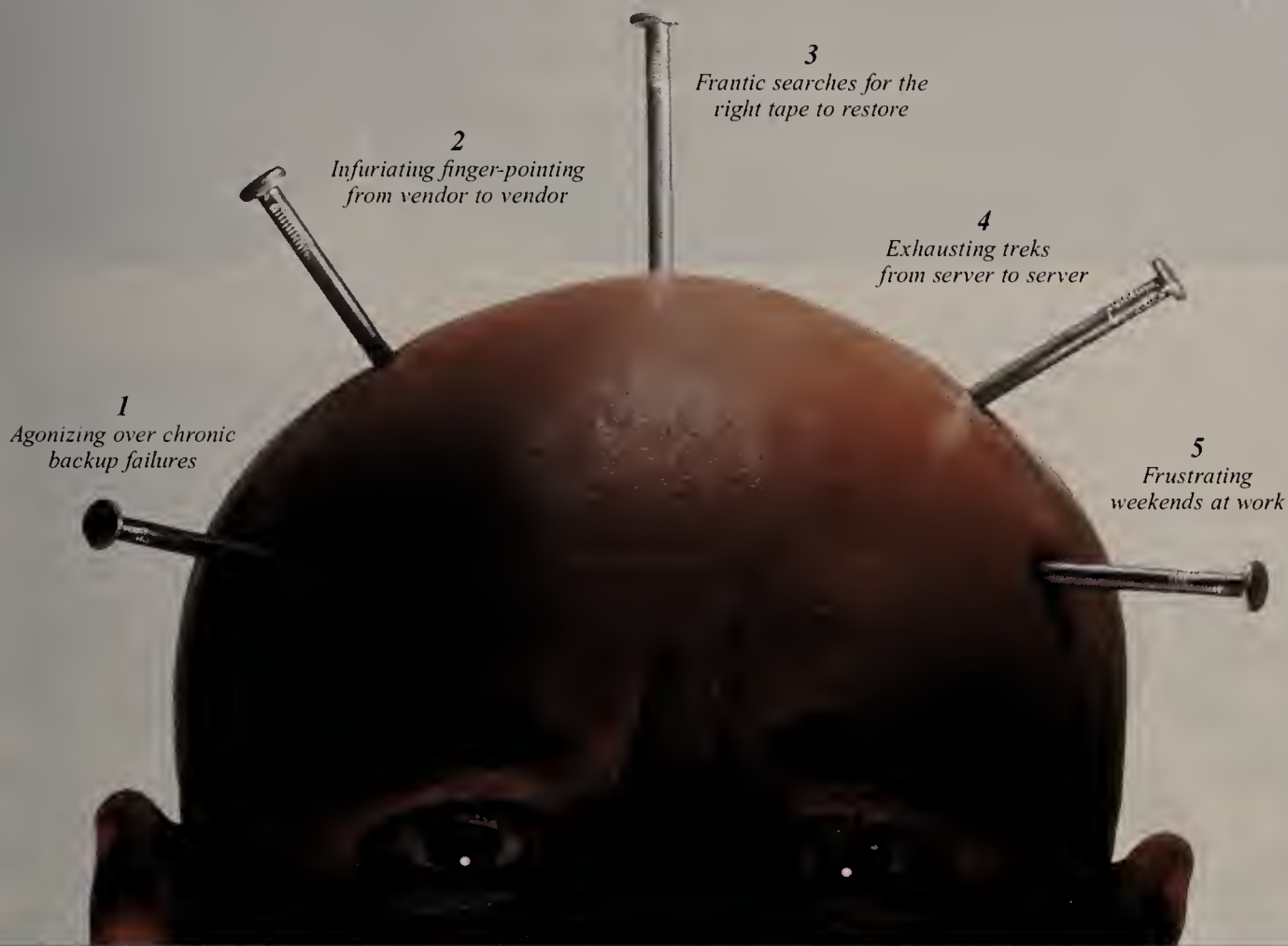
Essential infrastructure components: service and support

With NetWare 4 and other Novell technologies as the foundation for your Internet/intranet-enabled system, you retain all the benefits of working with the world's networking leader. More network professionals sell, support and develop solutions for NetWare than for any other NOS in the world. More than 200,000 certified professionals support NetWare worldwide, with 125,000 candidates in the certification process. Additionally, more than 20,000 reseller partners around the globe sell NetWare. Over 6,000 applications have been written for the NetWare platform, with more than 170 of those integrated with NDS, allowing customers the freedom to select the solutions to best fit their business needs. In the last six months more than 2,000 developers have joined DeveloperNet™, Novell's subscription service for Novell developers, with 100 new developers joining each week. InnerWeb Publisher is another demonstration of Novell's commitment to the networking industry and the customer. Internet/intranet capabilities are just icing on the cake, and the cake has NetWare 4 written all over it. ■

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*Brian Clark, Senior Vice President and General Manager,
Solomon Software*



BRIAN: "Small to mid-sized businesses see their accounting systems as critical. Our customers focus on accounting, not database administration. They need accounting software that's easy to use, maintenance free and has the full power of a relational database."

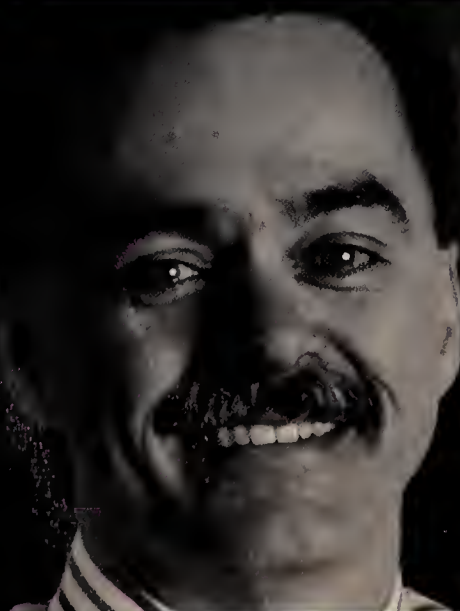
VERN: "With Scalable SQL, our system delivers superior performance and flawless data integrity. We can support any customer environment, from mobile systems to full client/server—and customers are less affected by network traffic and system overhead."

BUILT ON SCALABLE

BRIAN: "Scalable SQL gives users instantaneous access to information. It provides all the advantages of database products costing three times as much. And it uses a fraction of the computing resources."

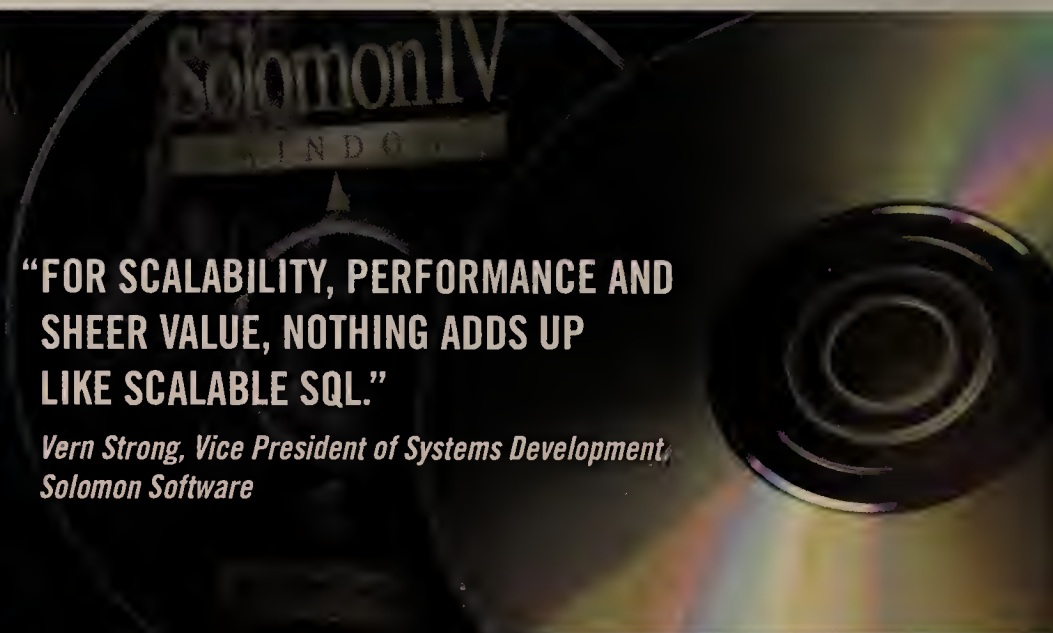
VERN: "When we set out to design Solomon IV, we envisioned a mission critical application for the middle market budget—an affordable product with an industry proven database, total data security and scalability. Scalable SQL made it all possible."

For the complete story about Solomon IV, winner of the PC Magazine/Price Waterhouse award for best Windows® accounting software, contact BTI. <http://www.btrieve.com> • info@btrvtech.com
800-BTRIEVE
512-794-1719



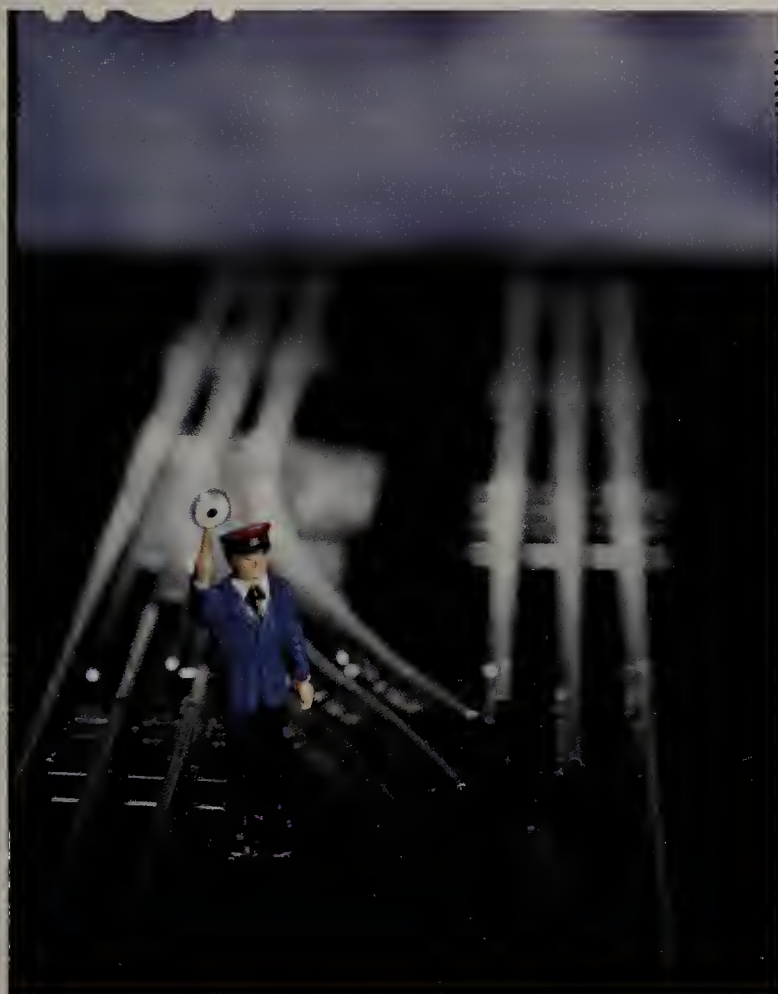
**"FOR SCALABILITY, PERFORMANCE AND
SHEER VALUE, NOTHING ADDS UP
LIKE SCALABLE SQL."**

*Vern Strong, Vice President of Systems Development,
Solomon Software*



Want improved Web access, security and management?

{ Go NetWare 4. }



EVERYONE wants access to your network: desktop users, roving workers, telecommuters, suppliers, customers and the occasional criminally insane hacker. So, how do you provide simple, unimpaired Internet/intranet/WAN/LAN access to authorized users while barring the gateways to undesirables? How do you effectively manage your piece of the global network puzzle?

We recommend turning to NetWare 4 and Novell. With proven technologies like NetWare 4 and Novell Directory Services (NDS), and new solutions including

InnerWeb Publisher and NetWare Web Server, Novell is the way to go.

Remote or on site, the access is easy

Whether the authorized user is wedged behind a desk, relaxing on a beach or roaming the factory floor, access is equally easy and secure with NetWare 4 and NDS. NDS provides quick, logical, single-login access to network resources and services whether there are five network users or 50,000. One password enables the user to access multiple web servers and intranets and download files without needing to know the physical location of any network resources. NetWare Connect 2™ and NetWare Mobile™ link travelers easily into NetWare from a



Want improved Web access, security
and management? Go NetWare 4.

variety of locations and platforms—wired or wireless—using a single interface to select any of several access methods and configurations. Whether the user is remotely connected to the network or working offline, complete network access is available. The engineer en route to a construction site, for example, can transfer selected network data to a mobile PC before leaving the office, then update automatically when reconnected to the network. NetWare Mobile also makes it possible to maintain wireless LAN connections throughout a campus environment. And LAN WorkGroup™ 5 gives Windows and DOS users centralized access to information on both NetWare and TCP/IP networks (intranets), including UNIX systems and the Internet. This allows users to access a powerful suite of WinSock-compliant applications. It also makes the lives of network administrators easier by greatly simplifying administration of TCP/IP connectivity with its centralized installation, IP addressing and workstation configuration.

Security is a core NetWare service, and it shows

Novell has always led the industry in the area of network security, and the Internet hasn't changed matters. NetWare 4 offers security at the server, at the client, over the wire and to the network as a whole system. In fact, NetWare 4 is the only network operating system slated for the U.S. federal government's C2/E2 Red Book certification, which requires the entire network to meet the highest security specifications. NetWare 4

utilizes the RSA encryption standard that uses a two-part key to enable a single login authentication and transparent authentication at every server thereafter. Digital signature enables tamper-proof commercial transactions and worldwide user identification; network resources can also be protected to allow for charging for their use. As for data loss concerns, fault-tolerant options provide complete server redundancy; NDS database replication can provide easily accessible copies of mission-critical data; and, of course, there is the advanced system reliability of NetWare that maximizes uptime—which leads to job security. Although the Internet and online services open

safely access the information they need without leaving the network open to security breaches. Novell is extending the concept of security just as the Internet is expanding the network. In other words, not a moment too soon.

Centralized system control isn't a thing of the past

It may seem like Internet technologies are taking over the world, but that doesn't mean network administrators can't take charge. NetWare 4 and NDS offer an intuitive graphical user interface that makes it easy to view hierarchies of users, groups, network devices and applications on an intranet. And they

NetWare Connect Services is connected to the Internet over a secure firewall so information can be accessed without security breaches.

corporate networks to the world as never before—creating a whole new set of security concerns—NetWare 4 and other Novell products provide the technologies that protect against intruders and/or system degradation.

NetWare Connect Services, for example, provides a higher class of public network service than what is available today over the Internet. With AT&T and other global telecommunications leaders, Novell is marketing NetWare Connect Services as a "business class" service, connecting a company's intranets in a secure and manageable way. Equally important, NetWare Connect Services is connected to the Internet over a secure firewall so users can

can all be managed with drag-and-drop ease. If a user is transferred across country, there's no need to log into a separate server or administer multiple domains like you would with Windows NT Server. With NDS, simply drag the employee icon to its new location. As for managing network resources, NDS integrates with numerous E-mail, groupware, fax, telephony and other applications. So, a single directory can be employed for multiple purposes. For example, one directory can be used for both network user identification and E-mail addressing.

However, Web access creates additional administrative requirements. To optimize network performance

Now the solutions that help you take full advantage of your network aren't out of reach. They're on this card.

For free information on the products listed below, complete and return this card or call 1-800-844-6661.

- ☐ Novell®/NetWare® 4.1
- ☐ Novell/NetWare Connect Services™
- ☐ Novell/GroupWise™
- ☐ Novell/Internet Solutions
- ☐ Axis Print Servers
- ☐ Btrieve/Scalable SQL
- ☐ Cheyenne Software/ARCserve 6.0
- ☐ Citadel/NetOFF
- ☐ Hitachi Data Systems/HiLANder
- ☐ Quarterdeck/IWare Connect
- ☐ Seagate Software/Backup Exec
- ☐ Stac/Replica

How many workstations are at this location?

- ☐ 1-24
- ☐ 25-49
- ☐ 50-99
- ☐ 100-499
- ☐ Over 500

What is your role in the purchasing process?

- ☐ Approve
- ☐ Evaluate and recommend
- ☐ Decision made elsewhere

What is your purchase time frame?

- ☐ Less than 2 months
- ☐ 2-3 months
- ☐ 4-6 months
- ☐ Longer

Are you a reseller? ☐ Yes ☐ No

Do you have a preferred reseller? ☐ Yes ☐ No

Company _____

City _____ State _____

Which version of NetWare do you currently use?

☐ NetWare 3 ☐ NetWare 4.0 ☐ NetWare 4.1

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____



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Everything's Connected.

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As your business becomes increasingly dependent on its information systems, data protection becomes an integral part of your data management strategy. And, for NetWare environments, Seagate Backup Exec for NetWare is your safest, most reliable data protection solution.

Multi-Platform Data Protection.

Seagate Backup Exec is easy to use, and with its extensive multi-platform support, it will protect all your NetWare, Windows NT and LAN Servers. What's more, it provides unmatched speed, using Seagate Software's exclusive Agent Accelerator technology. Seagate Backup Exec also provides automated administration and monitoring using client/server flexibility for reduced administration overhead. Plus, Seagate Backup Exec has earned "LAN Magazine's Product of the Year." It was also the first backup solution to be tested and approved by Novell for NetWare 4 and NDS.

Sized For Your Needs.

Seagate Backup Exec for NetWare, Enterprise Edition supports an unlimited number of NetWare, Windows NT and LAN servers. A Single Server - Unlimited Edition protects a single server and an unlimited number of DOS, Windows and Windows 95 workstations. Plus, a Single-Server 25-user Edition offers safe, cost effective data protection for smaller NetWare networks.

Integrated Data Protection and Storage Management.

With an installed base of over three million users, Seagate Software backup solutions will satisfy the data protection demands at all levels of the organization. Our award-winning solutions include DOS, OS/2, Windows 95, Windows NT and of course, NetWare - from the desktop to the enterprise, for networks of any size and complexity.

SEAGATE
Backup ExecTM

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Call Today, 1-800-729-7894.**



Seagate Software

THE AUTHORITY IN NETWARE DATA PROTECTION

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and security, network managers will want to keep tabs on logins, access to database files and intranet traffic more than ever before. NDS attaches labels to these transactions and gives administrators a clear picture of Web activity. And NDS can store diverse information about every Web resource on the network, from their exact physical locations to the number of megabytes available on a hard drive.

For end-to-end control of intranets of all sizes, ManageWise™ is essential. It automatically detects over 400 network problems including low server memory, high network utilization and viruses. And it lets IS staff manage widely distributed resources from one NMS™ console. In addition, more than 100 modules snap in to ManageWise for products such as IBM's NetView, HP's OpenView and ConnectView™ from Novell—an application that simplifies management of remote-user connections. ManageWise can save substantial sums of money because it does away with the need to post network administrators at every location or branch office. And Novell Application Launcher™ (a Novell add-on) lets IS staff deploy or update software on each user's desktop, also without leaving the desktop. Novell Application Launcher is especially handy now, with Internet technologies upgrading all the time.

The pace of change in recent years has been frenetic. Networks were once limited by how many walls and crawl spaces a technician could tear up in order to lay cable. Today, the only limitation is the human imagination, and right now that doesn't seem limited at all. But as long as Novell and others are extending the network in infinite directions, you can be sure that, working with our customers, Novell will also provide the access, security and manageability innovations necessary for conducting business and growing the global economy. ■

BUILDING AND MAINTAINING AN INTRANET: THE BASICS

Novell offers the power of the World Wide Web for your internal corporate network, all in a single software suite: Novell InnerWeb Publisher. It enables you to dramatically slash printing costs, provide up-to-date information to your users and facilitate inter-departmental collaboration as never before. InnerWeb Publisher provides all the tools you need to set up an intranet. Just follow these simple steps:

Intranet Implementation Steps	Novell InnerWeb Publisher Solution
1. Establish Web Server	NetWare 4.1 and NetWare Web Server 2.5
Bringing a server online to house information is the first step to building your corporate intranet. A minimum configuration for a high performance Web server would be a Pentium Pro PC with 32MB of RAM and a 1GB hard disk. After selecting the hardware, simply load NetWare 4.1 Runtime—it comes with InnerWeb Publisher—and NetWare Web Server software. NetWare Web Server supports Java applets, allowing you to access the latest Java-based applications. As for security, NetWare 4.1 includes NDS which authenticates users and provides other intranet safeguards so you can feel assured that your intranet is secure.	
2. Establish Web Server Access	NetWare 4.1 and IWare Lite
In the past you would need to have TCP/IP installed on each workstation that wanted intranet access. InnerWeb Publisher changes all this by allowing workstations to access an intranet via IPX, the protocol already running on a majority of today's LANs. This gives a system administrator the option of building their intranet using all TCP/IP, all IPX or a mixture of both. For a NetWare network with DOS or Windows 3.1 workstation clients, an IPX-to-IP translator between the web server and the rest of the network is required. This is made possible by Quarterdeck's IWare Lite, an IPX-to-IP translator included in InnerWeb Publisher. Simply load IWare Lite on your intranet server and you have established access to your intranet for an unlimited number of users.	
3. Load Client Browser	Netscape Navigator 2.01
Netscape Navigator gives all your users the same interface and outstanding graphics-viewing and HTML document translation capabilities. InnerWeb Publisher includes Netscape Navigator—the de facto standard Internet/intranet browser—with a multiple-user license that can be upgraded to accommodate your company's specific needs. If you are using Netscape Navigator with NetWare Web Server you can actually browse the NDS tree.	
4. Create HTML document	HoTMetal Light
And now for the fun part: creating web pages. InnerWeb Publisher contains HoTMetal Light, an HTML authoring tool that combines high-powered template and forms tools with traditional word-processing features. This makes it easy for users to quickly create slick-looking web pages. The primary benefit? Almost anyone can produce intranet documents instead of depending on IS to do the work.	

Visit <http://www.novell.com/icd/nip/index.html> for more information on Novell InnerWeb Publisher.



QUARTERDECK® AND NOVELL® MAKE THE CONNECTION.

Did you know Novell chose Quarterdeck's IWare Connect™ technology to serve as a critical component of its new **Intranet** solution — Novell InnerWeb Publisher™? Now, you can use the same technology for **Internet** access.*

Quarterdeck IWare Connect provides you with the powerful IP management, security, and access control capabilities you demand. One ten-minute install, and your worries are over — because Quarterdeck IWare Connect is the secure, simple to use, and easy to manage Internet solution for NetWare networks!

IP MANAGEMENT: With Quarterdeck IWare Connect, you don't need to install and configure TCP/IP on every workstation. Just one install in the NetWare server and your IP management and addressing headaches are over.

SECURITY: Quarterdeck IWare Connect's security firewall allows direct Internet access to every computer in your network, but hides each one from the outside world to render you invulnerable to break-in attempts.

ACCESS CONTROL: Quarterdeck IWare Connect enables you to selectively offer access to individual workstations according to criteria you specify — by NetWare user or group, by application type, by time; even by destination and source addresses! It also provides you with a log of Internet usage by

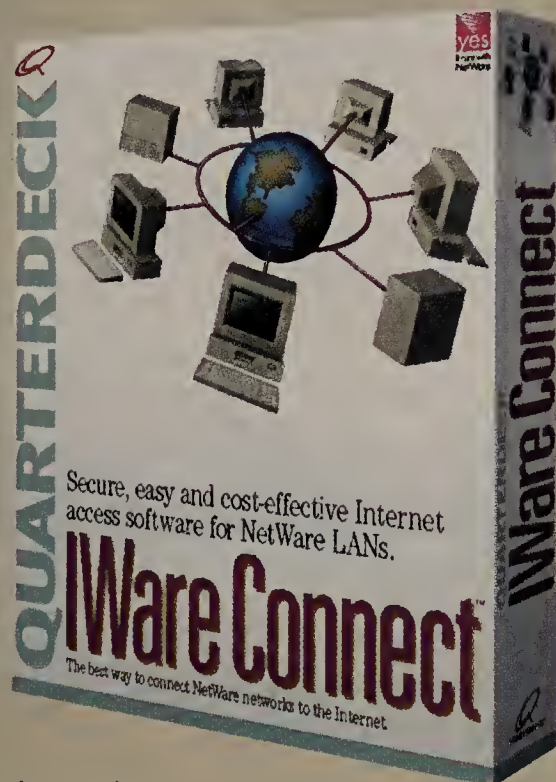
user, so that you can see patterns that'll help you plan ahead.

WANT TO LEARN MORE?

Now that you know that Novell connected with Quarterdeck to plug you into the Intranet, learn more about how we can help you securely connect to the Internet. Want to read a special white paper on security or, better yet, download a trial copy of

Quarterdeck IWare Connect and see for yourself?

Just give us a call at (800) 225-8148, visit our website at <http://www.quarterdeck.com/>, or e-mail us at iware@quarterdeck.com.



Call us at: (800) 225-8148 or visit our Web Site at: <http://www.quarterdeck.com/>
Ask for code 01603. E-mail: iware@quarterdeck.com

*IWare Lite™, a customized version of IWare Connect, is bundled with Novell InnerWeb Publisher for Intranet web access.
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knowledge of all
human existence.



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The Big Bang. The Bible. The Brain. Just to browse one billionth of the Bs. Access to the Internet makes it all possible. And you can access it all with Novell® products: LAN WorkPlace®, LAN WorkGroup™, the NetWare® MultiProtocol Router™, and GroupWise™. Or, if you want more than just access, the NetWare Web Server makes it easy to publish on the Internet and your own intranet. There—you've just made your network smarter, more global. So you don't have to carry the wisdom of the ages in your head. Novell. We're connecting everybody. For more information, call 1-800-453-1267, or check us out at <http://www.novell.com> on the Internet.

Internet Solutions


Novell.
Everything's Connected.

Enhancing productivity on the Internet/intranet

with NetWare 4.

"THE FACT that *TV Guide* has been known to make larger profits than all four networks combined suggests that the value of information about information can be greater than the value of information itself."—Nicholas Negroponte, *Being Digital*. You can have access to all the information in the world, but it is only valuable if you can refine it, customize it and make timely use of it. Which is why

Professor Negroponte's observation about "the value of information about information" is so telling.

The quest for information about information is what the so-called information superhighway is all about. It's why new Internet/intranet technologies, data warehouses and information technology think tanks are multiplying faster than fruit flies. Information about information provides a powerful competitive edge. It is the key to better products and services for entrepreneurs and well-established businesses alike. And it is the foundry that forges new links between businesses, their customers and suppliers.

Providing access to information about information is one of the basic elements of





Enhancing productivity on the
Internet/intranet with NetWare 4.

the Internet and corporate intranets. The Internet and corporate intranets will provide not just access to information but the ability to use that information to your benefit by paring it down to your specifications.

Novell and its partners are offering innovative Internet/intranet technologies that are being leveraged by enterprises everywhere to make their people more productive and their businesses more profitable.

Intranet integration reduces the cost of expense reporting

Expense reporting can be a serious waste of time and money, especially in large organizations. Far too often, antiquated tracking systems are employed for collecting and authorizing payment of paper-based expense reports. Employees fill out and sign forms, then everyone from the mailroom intern to the department boss must get involved before the paperwork finally finds its way into the finance department. Finance then reviews the numbers, approves the report, enters it into the system and cuts a check, which goes back into interoffice mail and eventually to the employee's in box. And, as anyone who has ever dealt with an expense report can tell you, this process can take anywhere from a month to six weeks to complete.

Today Novell and its partners can provide network solutions that can save millions of hours and truckloads of money annually. Let's begin with the modern employee who has just returned from a road trip. She starts her day by logging on to NetWare 4.1 and opening up GroupWise™. She pulls up the company's expense

report electronic form, fills in the appropriate numbers, attaches her digital signature and exits the form. It is then automatically forwarded to a manager and the finance department via the company intranet. Finance reviews the electronic expense report and authorizes payment. A GroupWise payment-request electronic form (filled in automatically using human resources information) and a check are completed online. The latter is then direct-deposited into the employee's bank account via the company's intranet or the Internet

connections. With ANCS, one NetWare user can request bids from several distributors simultaneously. NetWare and Novell Directory Services (NDS) can then initiate the most cost-effective order by automatically forwarding an electronic form to the retail manager for his or her approval and signature. With AT&T NetWare Connect Services, businesses large and small obtain an affordable, secure business internet that combines the reliability, security and service of the AT&T Telecommunications Network with

Novell and its partners are offering innovative Internet/intranet technologies that can make businesses more profitable.

and NetWare Web Server utilizing Open Market electronic commerce security technologies.

Gearing up for annual winter white sales

Snowblower manufacturers have a tough time anticipating demand every year. Of course they know that customers will line up when the snow starts piling up. But predicting exactly when those events will take place—and preparing for them—isn't easy. Enter networking technology at its best. As snowblower purchases begin to snowball and inventories start getting low, that information is relayed via AT&T NetWare Connect Services (ANCS), to snowblower distributors. ANCS creates WAN connections for NetWare LANs instantly—without the need to build and maintain those

NetWare technology. Any NetWare network can be linked securely with any other NetWare network anywhere in the world.

The intelligent office: where machines are smarter than you think

A hypothetical situation: the order just came down from on high that a proposal the size of a telephone directory must be delivered to executives on four continents within the hour. With NetWare 4.1 and Novell Embedded Systems Technology™ (NEST™), it's easy. Within seconds, anyone in the office can select the appropriate file at their desktop, click on the icon of the nearest fax machine or fax server, and command it to send the file to branch offices wherever they may be. Utilizing NEST AutoRoute™ software, the fax machine can send the file to printers, copiers,

secure your net work

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NetOFF automatically logs off inactive users.

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Closes and saves all work in progress.

- **Logoff System**

User defineable screen savers.

Logout ensures a reliable backup everytime.

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Saves open files and logs off network.

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Now shipping Version 5
Supports Windows 16 & 32 bit operating systems
Supports Novell & Microsoft NT servers



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Enhancing productivity on the Internet/intranet with NetWare 4.

fax machines or multi-function devices anywhere in the world in the most cost-effective manner, either by fax-relay broadcasting or via the network. On the other end, each receiving device can address copies of the proposal and notify recipients via E-mail that the document has arrived (either as hard copy or digitally on their PCs). NEST AutoRoute technology is available now in Ricoh 2700L fax machines and Cheyenne Software's FAXserve 301 fax server. NEST software not only connects NetWare networks with fax machines and servers; everything from print servers and TV set-top boxes to heating and cooling systems and automobiles will soon be NEST-enabled nodes on the network.

Internet/intranet advantages are here today

Accessing and organizing the infinite number of bits we have within our midst—separating the wheat from the chaff and the precious metal from the ore—that's what is necessary right now in the networked world. Novell CEO Bob Frankenberg likens the present state of online affairs to people trying to quench their thirst at a fire hose. In his words, "they're thirsting for information but drowning in data." Novell is working with strategic partners to provide more intelligent ways to access and manage information on the Internet and corporate intranets now and in the

future. And new developments, with NetWare 4 and NDS at the core, are adding value every day.

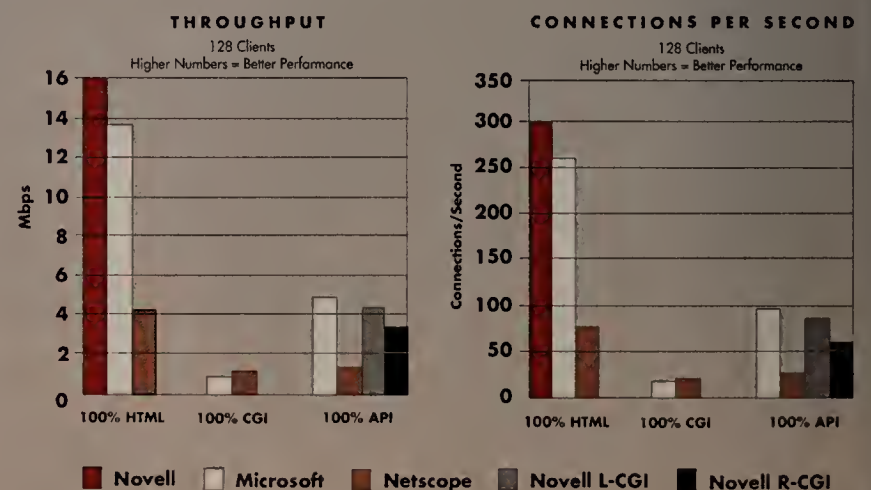
These are exciting times. In less than two decades we have progressed from staring wide-eyed at the wonders of word processing and spreadsheets on our first clunky PCs to conducting business collaboratively and globally using the latest networking technologies. As the entire world becomes one on the wire, information about information is reaching a critical mass. The information and technologies you need are heading your way right now, with products from Novell and its partners providing the intelligence to connect your world. ■

NETWARE OUTPERFORMS WINDOWS NT SERVER: ANOTHER REASON TO USE NETWARE ON YOUR INTRANET.

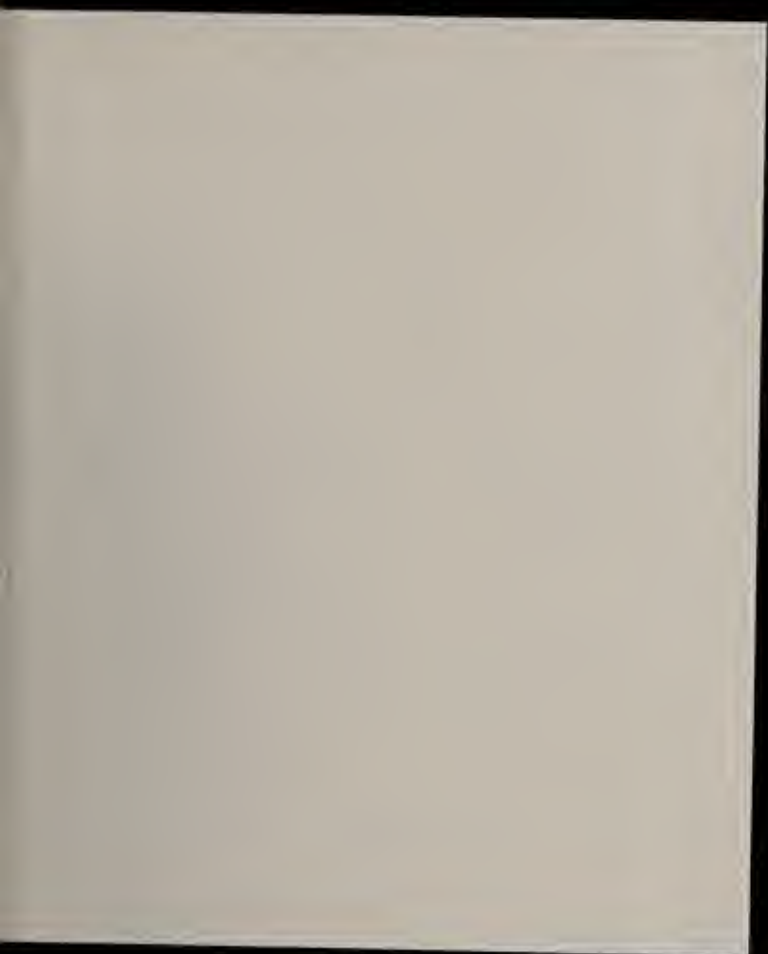
"The superior HTML performance and strong API performance of the NetWare Web Server means that Web site managers running HTML with or without API requirements will find the Novell server is an ideal alternative for minimizing hardware costs, allowing a comfortable margin for peak loads, and providing the maximum room for growth." —Executive Summary, Haynes & Company/Shiloh Consulting, Performance Benchmark Tests, March 1996.

Independent consultants, Shiloh Consulting and Haynes & Company, measured the throughput, connections per second, average response time, and error rate of NetWare Web Server and Microsoft Internet Information Server running on NetWare 4.1 and Windows NT Server version 3.51, respectively. On straight HTML performance tests and on CGI and API throughput assessments, NetWare 4.1 and the NetWare Web Server consistently outperformed Windows NT and Microsoft Internet Information Server. When serving 128 clients, Novell throughput was 16% greater than

Microsoft. The Novell HTML performance advantage increased consistently as the number of clients making requests increased. Thus, regardless of the size of your network and the daily load requirements, NetWare Web Server is the high-performance, cost-effective solution.

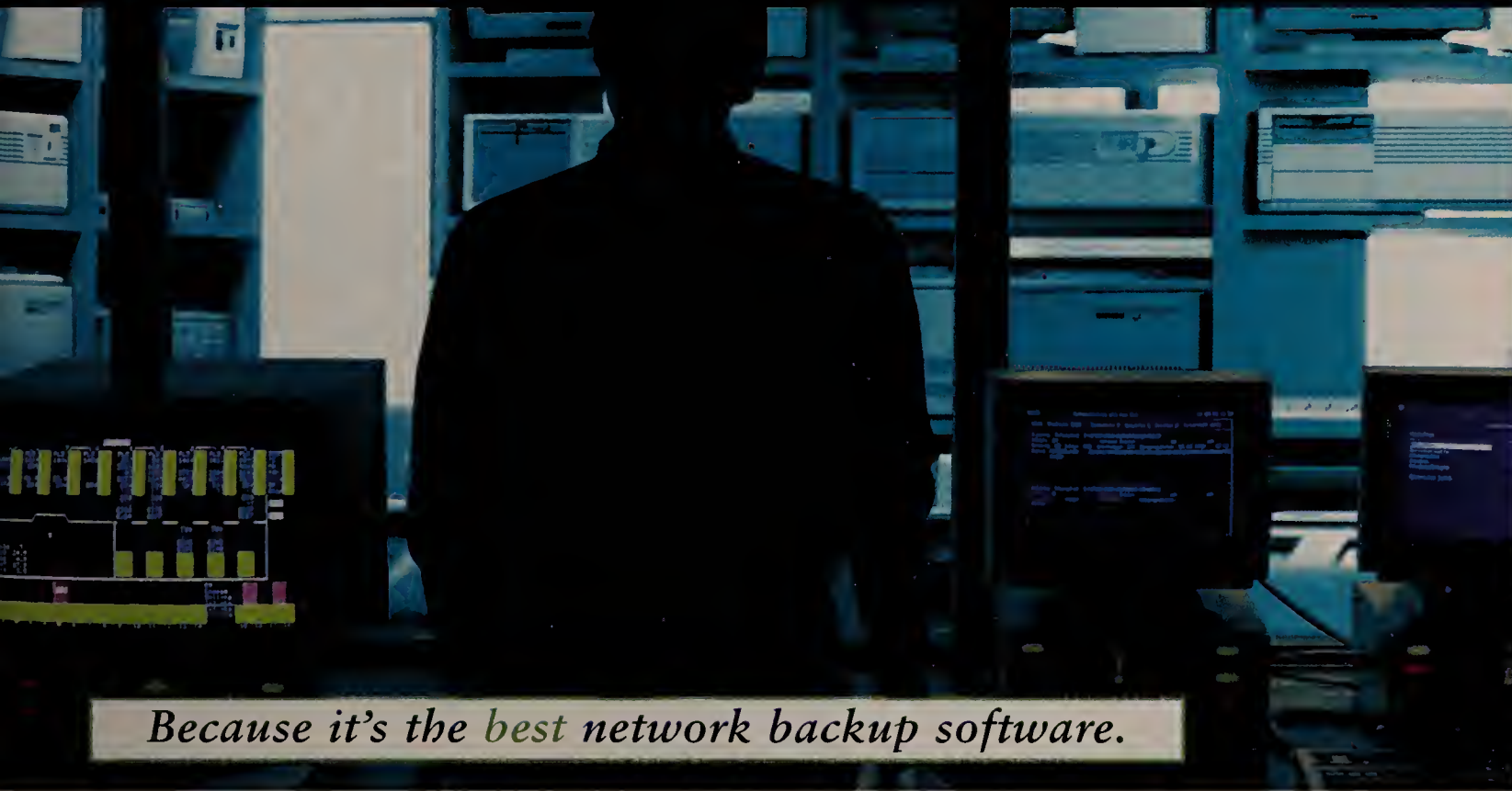


The Shiloh Consulting/Haynes & Company study is available on the Web at <http://iamg.novell.com/iamg/internet/shiloh/shiloh.htm>.





Why is Cheyenne ARCserve the best-selling network backup software?



Because it's the best network backup software.

In the business of network backup, you get to the top by setting the standard. And you stay on top by raising it.

That is precisely what Cheyenne has done with ARCserve 6.0. The NetWare backup solution that combines innovative new technologies with unsurpassed performance and industry-leading technical support.

New features include:

- Support for NetWare 4.1, NDS, and Extended Schema.
- Automated disaster recovery, for quick restoration of downed servers.

- RAID fault tolerance*, for uninterrupted backup and restore.
- High-performance, interleaving Push Agents*, to back up remote servers simultaneously, and eliminate two-way backup traffic.

For a free 30-day live trial of ARCserve 6.0 for NetWare, call 1-800-317-5227** and ask for Extension 61, or contact your local reseller. You'll see what made us the world leader in backup for the past five years—and how we plan to stay on top for years to come.

The Award-Winning Cheyenne ARCserve 6 for NetWare.



ARCserve 6.0 for NetWare



CHEYENNE *Expect nothing less.*

World Wide Web: <http://www.cheyenne.com/arcserv6.html> • CompuServe: GO CHEYENNE • Fax: 1-516-465-5750

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HAVE YOU LOOKED AT PRINT SERVERS LATELY?

I mean REALLY looked.

	AXIS	HP ¹	INTEL ²
Throughput	400 KBytes/s	230 KBytes/s	180 KBytes/s
Mainframe & AS/400 Support (SNA)	Yes	No	No
Logical ("Virtual") Printer Functions	Yes. Character set conversion, ASCII-to-PostScript, re-direction at busy, data before/after job	No	No
NetWare Support (IPX/SPX)	NDS & Bindery Mode 4 frame types simultaneously	NDS & Bindery Mode 1 frame type	NDS or Bindery Mode 1 frame type
UNIX Support (TCP/IP)	LPD, FTP, Reverse Telnet, Named Pipe and Filter	LPD, Reverse Telnet	LPD, requires NetWare server
TCP/IP Auto-Install Scripts	Yes	No	No
Microsoft Support	NT, WFW, Windows '95	NT, WFW, Windows '95	NT, WFW, Windows '95
Network-Loadable Flash	Standard FTP utility (via TCP/IP)	Proprietary utility (via IPX only)	Proprietary utility (via IPX only)
Management/Admin.	NetPilot	JetAdmin	NPManager
Warranty	5 years	3 years	3 years



Maybe it's time to improve your peripheral vision. Take a squint at the chart above, and see what you might be missing.

Axis. Unlike our big competitors, we're peripheral sharing specialists. We offer a family of intelligent print servers that let all your users share any printer on your network – no matter how complex your network may be. From the workgroup to the enterprise, Axis offers cost-effective, easy-to-manage solutions for even the most extreme printing challenges. Including connecting LAN printers to legacy IBM mainframes and SNA applications. All backed by a best-of-breed warranty: 90-day money-back, overnight air swap, 5-year repair or replacement. So when you're checking out print servers, there are plenty of good reasons to keep Axis in the corner of your eye. You can learn them all in our handy guide, *Ten Things The Big Guys Won't Tell You About Print Servers*. Call today for your free copy.

**TEN
THINGS
THE BIG GUYS
WON'T TELL
You About
PRINT SERVERS**



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Novell and its partners on the Web—

{ Success through
cooperation. }

“A N A R M Y that is inflexible will not conquer; A tree that is inflexible will snap.” —Lao Tzu, Tao Te Ching. Networking is, by definition, flexible. It is the essence of give and take—people working together, forging relationships that benefit the individual as well as the group. And flexibility is something about which Novell knows a great deal. The pioneer in network computing, Novell has been the source of major advances in network technology on its own.

Today, that flexibility is bearing fruit with Internet/intranet, partnership-driven solutions. It's unusual for a month to go by without an announcement from Novell and other information technology leaders concerning a major product-development collaboration. Here are just a few of the “greatest hits.”

Java and NetWare 4 are made for each other. As part of an agreement between Novell and Sun Microsystems, Novell will soon offer its developers and customers access to the complete Java





Novell and its partners on the Web—
Success through cooperation.

platform, including the core power of Java, the Java Virtual Machine, which allows for Internet application development. The world will soon have a brand new developer environment that encompasses the installed base of more than 3 million NetWare servers; an environment whose applications will soon be accessed and distributed across business intranets and the Internet regardless of client platforms. With Java embedded into the NetWare NOS, Novell can provide the functionality of Java to its third-party software developers, who in turn can create Java applications in NetWare. Java will provide the next-generation application execution environment for NetWare, and NetWare will provide the next major application platform for Java.

Novell also has a strategic partnership with another Internet pioneer, Netscape Communications Corporation. Novell recently announced that its InnerWeb Publisher, to be released in June, will include Netscape Navigator. Enterprises are thus able to use NetWare Web Server with Novell's InnerWeb Publisher to transform their LANs and WANs into intranets with the look and feel and functionality of the leading World Wide Web browser.

Making the Internet and intranets safe for financial transactions is also an area in which Novell is developing critical solutions. With its partner, Open Market Technology, Novell is providing customers with powerful, cost-effective solutions for establishing and maintaining online storefronts and managing electronic transactions on the World Wide Web.

Novell will use OM-SecureLink technology to enable customers to connect their NetWare Web Server to Open Market's OM-Transact Internet transaction management system. The Open Market technology utilizes digital encryption to securely transmit "digital offers" from a customer's server to either an internal or third-party backoffice service provider. To ensure the integrity of the transactions, OM-Transact checks each digital offer using a secret key it shares with the customer. NetWare is an optimal platform for electronic commerce due to the secure, managed, high-performance environment created by Novell Directory Services (NDS). The

extension of NDS to fully support the Lightweight Directory Access Protocol (LDAP), an emerging X.500 directory access standard for the Internet. With LDAP support, users on any platform can connect to NDS using a standard browser such as Netscape, and can access NDS information across native IP connections. What's more, users will be able to use a single directory—NDS—to support multiple applications and services. The IS department can forget about supporting redundant systems, and developers can create applications that access and use NDS by supporting LDAP or by using Novell's directory API set.

Novell is working with more than

**NetWare is an optimal platform for electronic commerce
due to Novell Directory Services.**

integration of OM-SecureLink with NetWare 4 and NDS will provide IS managers with real control over electronic commerce security issues by ensuring that transactions are authorized correctly.

NDS integration is the key to partnerships of all kinds. Novell is extending NDS to support UNIX, Windows NT Server and other platforms besides NetWare itself so that its functionality is readily available across multivendor networks. The most advanced directory services technology, it's no wonder NDS is becoming the de facto directory standard of networks. And soon the same will be true of the Internet. Novell recently announced the

120 partners, who have released or are developing NDS-enabled products. AT&T NetWare Connect Services (ANCS) is one of the most high-profile of these products. It is the first global business data network capable of safely handling electronic commerce as well as the exchange of confidential or business-critical information. With ANCS, businesses obtain carrier-grade reliability and security, around-the-clock service and support, and comprehensive online assistance—all without having to build or maintain their own WANs. And unlike traditional WANs, users will have access to bandwidth on demand as their traffic needs increase. ANCS will enable

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Novell and its partners on the Web—
Success through cooperation.

companies large and small to become branch offices of a larger virtual enterprise. It will instantly interconnect far-flung NetWare LANs for internal communications needs or to securely communicate with customers, suppliers and trading partners. And ANCS provides easy access to the Internet and other online information services. In addition to AT&T, Novell is working with other leading communications carriers throughout the world, who will soon join AT&T in providing NetWare Connect Services global networks. With this service, entire LANs and all of their users will be part of a worldwide network.

Easy access to this worldwide network is also assured thanks to the standards-based flexibility of GroupWise. Through GroupWise, users can readily connect with NetWare Connect Services, the Internet, corporate intranets, popular online services, E-mail from all major vendors, and groupware systems including Lotus Notes and Netscape Collabra Share. With the launch of GroupWise XTD later this year, Novell will add a robust "Universal In Box" containing a user's E-mail, voice messages, faxes, work assignments, task management and personal schedule. GroupWise XTD will also include a full replication facility which enhances mobile access and support.

An important part of the Novell commitment to the future of computing is the networking of unconventional network nodes; that is, "intelligent" microprocessor-driven devices other than computers. Novell and its partners are using

Novell Embedded Systems Technology (NEST) to make these products NetWare clients. They include everything from automobiles to alarm systems and office machines to factory robots. Novell is working with leaders in information and consumer technologies, including Canon, Intel, Hewlett Packard, Cheyenne Software, Xerox, Ricoh and major automakers. More than 75 partners are now working with

products ever since Novell Labs™ established certification criteria back in 1985. It lets vendors and customers alike know that their products meet or exceed Novell's standards for compatibility. Currently, approximately 6,000 products are eligible for Yes certification.

Networking via the Internet and corporate intranets can be made cost-effective, productivity-enhancing and secure for everyone from mom and

Net2000 will create an incredibly rich network application platform on which to create new services and client-networked applications.


Novell. Many NEST-enabled products are entering production, with more than 100 expected to launch by year's end.

Another important aspect of Novell's new networking initiative is Net2000, the world's first cross-client, cross-application server, cross-network API. Net2000 will create an incredibly rich network application platform on which developers can create new services and client-networked applications. Moreover, developers will be able to use familiar tools to build them.

Novell has always made it easy for developers—original equipment manufacturers (OEMs) and independent software vendors (ISVs)—to create and market Novell-compatible products. Through the Novell Yes certification, testing and co-marketing program, developers can set their products apart from the rest. The Yes logo has been the widely recognized seal of approval for these

pop operations to multinational enterprises. This is especially true when customers are simply adding to their existing NetWare infrastructures and making the most of new products that are coming on line all the time due to synergistic relationships between Novell and its partners. Combining the best of NetWare with other innovative Internet/intranet technologies provides Novell with the flexibility and the opportunity to meet the sophisticated needs of today's and tomorrow's customers. ■

Learn more about NetWare 4
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Briefs

■ **Computer Associates International, Inc.** said it will include Digital Equipment Corp.'s OpenVMS operating system in the broad enterprise management alliance, which was announced by the companies in April (NW, April 29, page 8).

Specifically, CA will enable users to manage OpenVMS systems from an integrated CA-Unicenter/Digital Polycenter platform on Windows NT and Unix. The company will also incorporate support for DECnet network protocols in CA-Unicenter. CA-Unicenter already supports IP and SNA protocols.

Products will be released by the end of this year, said Yogesh Gupta, senior vice president of product strategy for CA. - CA: (800) 342-5224.

■ **IBM** last week added a low-end frame relay access device to its repertoire of frame relay switches. The Nways 2218 Model 12X offers two ports that can link SNA, bisynchronous or asynchronous traffic onto one frame relay circuit. The Model 12X will be available this month; the vendor has not yet announced pricing.

IBM: (800) 426-2255.

■ **Infonet Services Corp.** last week announced availability of its SiteWise LAN Management Services. Customers can out-source the monitoring and management of their networks, systems and applications, which the vendor will handle remotely. The service will be available on a per-device and per-site basis.

■ **Pacific Bell and IBM** last week announced a partnership to bring users a portfolio of network equipment and services, including LAN design, monitoring and support.

Using the sales forces from Pacific Bell Network Integration and IBM's Integrated Systems Solutions Corp. (ISSC), the two will market services down to the desktop, something Pacific Bell could not offer before. Pacific Bell fills a gap in ISSC's offerings by bringing networking services to the deal.

Cabletron's VNS plan going slow

By Jim Duffy
Rochester, N.H.

More than a year after disclosing an ambitious program to standardize its virtual networking technology, Cabletron Systems, Inc. has yet to identify any supporters.

In March 1995, Cabletron discussed the formation of a "Synthesis partners program," whereby switch and operating system vendors would implement Cabletron's SecureFast Virtual Networking Services (VNS) technology in their products and promote its Syn-



Cabletron's Skubisz says the company has vendors waiting in the wings for the partner program.

See Cabletron, page 20

Attachmate gives in to Microsoft's SNA Server

Will ditch Emissary as part of new Microsoft deal.

By Michael Cooney
Bellevue, Wash.

In one of the shortest, least contested battles in the industry, Attachmate last week folded its mainframe channel gateway tent and ceded that market to Microsoft.

Users deploying or planning to deploy Attachmate's Emissary TCP/IP Server will now be migrated to Microsoft's SNA Server package, which promises to help SNA users consolidate existing gateways while allowing high-speed access to mainframe resources over a TCP/IP backbone.

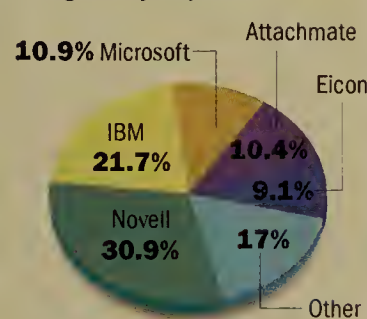
SNA Server is a Microsoft BackOffice application that runs on Windows NT Server and connects workstations to IBM mainframes or Application System/400 mid-range computers over TCP/IP, IPX/SPX, Banyan VINES and AppleTalk nets.

Most observers said Attach-

mate faced a stiff battle for the mainframe channel-attach market, going against such heavy hitters as IBM, Cisco Systems, Inc.

MARKET SHARE '95

SNA gateway shipments



SOURCE: IDC, FRAMINGHAM, MASS.

and the firm's traditional competitors such as Apertus Technologies, Inc. and CNT/Brixton (NW, March 11, page 20).

Also complicating the issue was the fact that the company already had close ties to Micro-

soft from past agreements. The Redmond-based software giant was not very happy about Attachmate going after a market on its own that Microsoft thought they could attack together. As a result, Microsoft basically pressured Attachmate into getting rid of the Emissary product, observers said.

At the time of the Emissary announcement, Attachmate executives said, "we have over 35,000 SNA gateways installed already, and we have those users telling us they want a way to migrate to TCP/IP. That's what we're doing with Emissary."

It apparently wasn't enough. "Attachmate, for one reason or another, has made the decision to piggyback on the success of SNA Server and use that tie to launch into the Web integration market," according to Lucinda Santisario-Borovick, a research manager with International Data Corp. in Framingham, Mass.

Emissary, we hardly knew ye

The Emissary TCP Server obituary was contained in a larger Attachmate announcement with Microsoft that established an Enterprise Alliance between the two companies.

As part of that alliance, Attachmate vowed to build closer links between not only existing Emissary users, but also its Extra and Rally SNA integration and emulation packages and SNA Server.

In addition, the company said its Internet host publishing system will be offered as an add-on product to SNA Server, effectively making SNA Server the package of choice to run Attachmate's Web-to-host connectivity products.

Attachmate will also work to develop a module that makes SNA Server compatible with the company's proprietary Gateway Access Protocol (GAP), which is deployed in existing Attachmate SNA gateways.

GAP provides the communications between the gateway and the mainframe. This capability will let users with existing DOS-based SNA gateways migrate to the SNA Server, executives said.

The timetable for the new products was not announced.

©Attachmate: (206) 649-6551.

Desktop telephony

Call centers lose their phones

By David Rohde
San Jose, Calif.

Not all vendors with roots in the telephone industry are quaking in fear of a future without telephone sets.

With Version 2.0 of its WinSet for Windows software, Aspect Telecommunications, Inc. is striking preemptively, giving users of its automatic call distribution (ACD) call-center systems the option of completely removing the telephone from agents' desktops.

Announced last week, Aspect WinSet 2.0 essentially takes the features of the company's specialized TeleSet phone set for call center agents and plops them onto a Windows 3.1 PC user interface.

The goal is to boost the effectiveness of call-center computer-telephone integration by unifying all agent functions on a PC screen, enabling complete

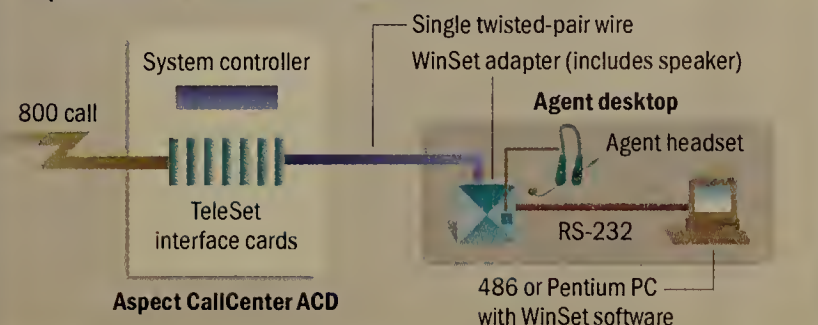
application sharing and exchange of information via the Windows clipboard.

Windows clipboard. By pasting the ANI number into an order application, the agent can then access customer database records.

"We believe we'll see a dramatic increase in agent productivity as tasks are streamlined

What, no telephone?

The 4" x 7" x 1.5" WinSet adapter can be mounted on a PC, placed on the desk or attached under the desk. This device helps place all the capabilities of Aspect's telephone set on a Windows PC screen.



For example, the Miami call center of computer catalog retailer Tiger Direct, Inc. is installing Aspect WinSet 2.0 to allow instant copying of an 800-number caller's Automatic Number Identification to the

and others off-loaded to software control," said Patrick Fiorentino, Tiger Direct's executive vice president of sales.

Instead of a TeleSet phone, Aspect supplies each desktop
See Call centers, page 20

Performance management wares speed toward market

By Jim Duffy

Two network management vendors have rolled out products designed to help users optimize the performance of their

networks.

3DVTechnology, a Nashua, N.H., start-up, unveiled software applications for monitoring the operation of router, hub

or switch-based networks.

Meanwhile, Net2Net Corp. has added support for the Simple Network Management Protocol to its CellBlaster ATM network analyzer. This enables the device to perform standards-compliant management of Asynchronous Transfer Mode nets in addition to analysis.

3DV's three applications analyze network device performance over a period of time and provide network managers with

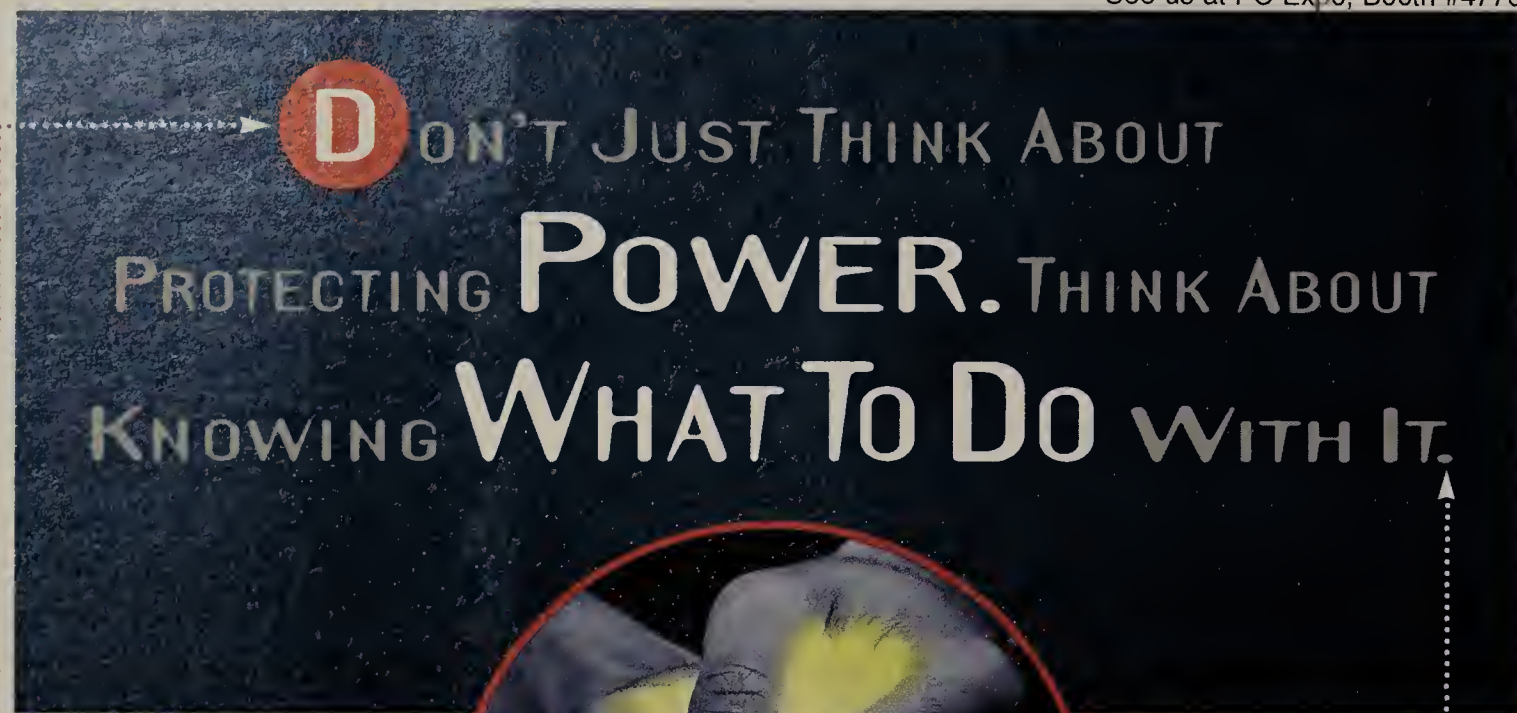
suggestions for remedying inefficiencies. The applications, which run on Windows NT-based Pentium computers, support Cisco Systems, Inc. routers and switches, and Bay Networks, Inc. and Cabletron Systems, Inc. hubs.

RouterPM, HubPM and SwitchPM each collect data via SNMP Management Information Bases, including the Remote Monitoring (RMON) MIB, and analyze it using a rules-based inference engine.

The inference engine identifies conditions that fall outside the parameters of healthy network performance and quantifies them via weekly and year-to-date reports.

Although analysts are impressed with the company's inference and reporting capabilities, they note that 3DV's data collection agents may be a liability.

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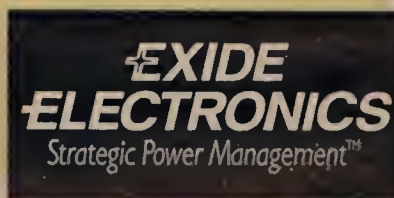
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Management makeover

New products from 3DV and Net2Net

3DV

- ▶ **RouterPM:** Performance management software for Cisco routers
- ▶ **HubPM:** Performance management software for Bay and Cabletron hubs
- ▶ **SwitchPM:** Performance management software for Cisco Catalyst switches

Net2Net

- ▶ SNMP agent implementation for CellBlaster ATM network analyzer

"Their agents don't communicate, so scaling the data up can be somewhat challenging," said Brian Burba, network management analyst at International Data Corp. in Framingham, Mass.

"You still have to bring all of that information into one point to do the processing. That works fine in a smaller deployment where you don't have that many agents," he said.

Each application is available now and priced from \$100 to \$1,000 per managed device, depending on the number of devices.

CellBlaster aims for ATM

ATM network performance is where Net2Net's CellBlaster is aimed. And with the addition of SNMP, statistics collected by CellBlaster can now be viewed by SNMP management platforms as part of an overall enterprise management scenario.

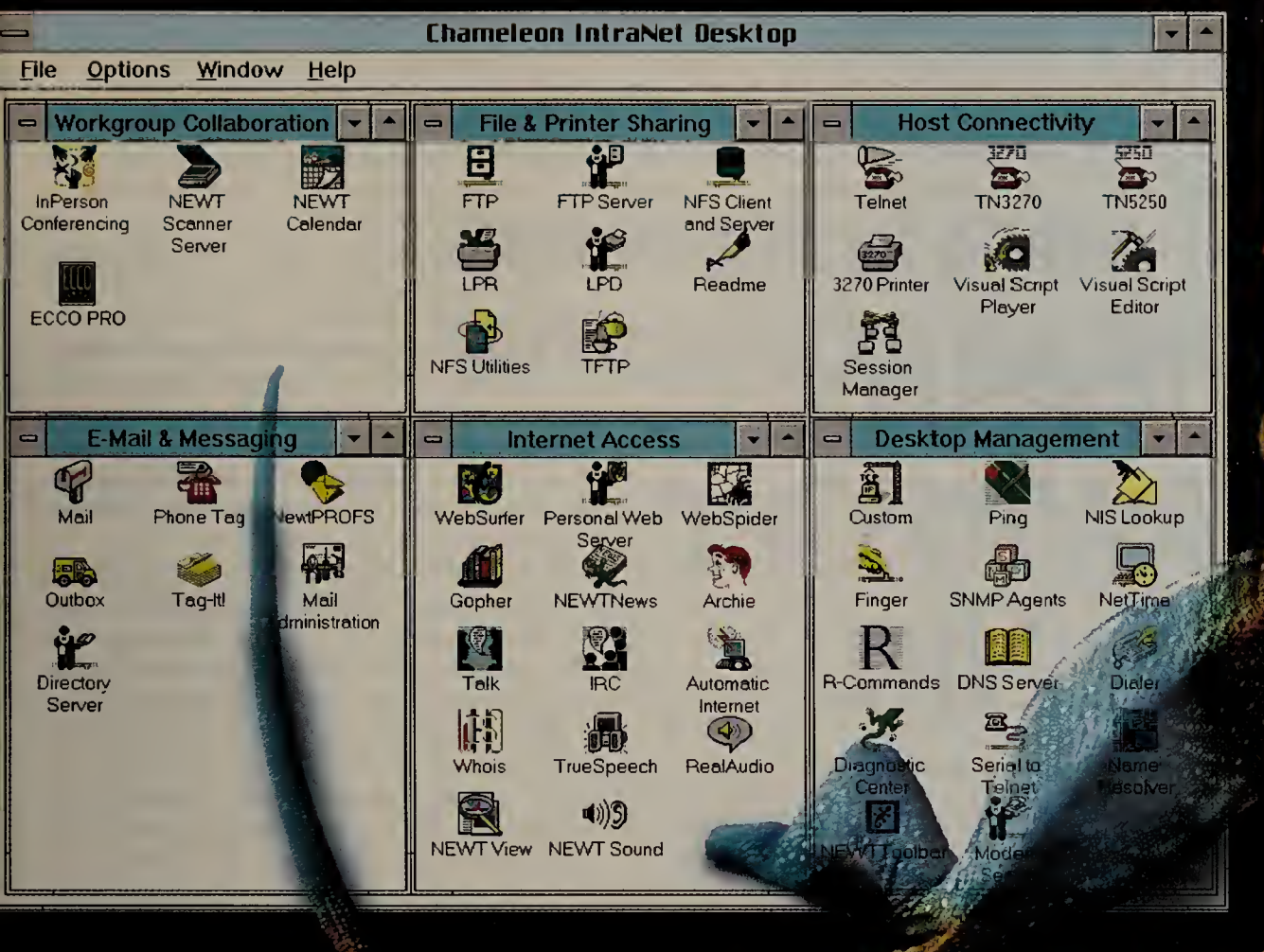
As an SNMP agent, CellBlaster supports Synchronous Optical Network (SONET)/Synchronous Digital Hierarchy and DS3/E-3 MIBs for monitoring high-speed, physical layer interface statistics. Future SNMP support will be extended to CellBlaster's private MIB, and ATM RMON and the AToM MIB.

The SNMP capability costs \$5,000. It will ship later this month.

©3DV: (603) 595-2200; Net2Net: (508) 568-0600.

COMMENTS?


See "How to reach us" on page 6.



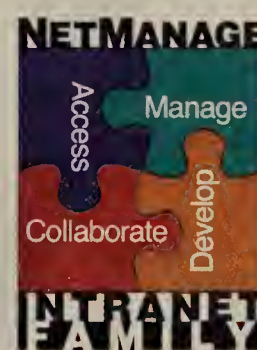
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Call centers

Continued from page 17

with the Aspect WinSet Adapter, a modem-sized device that links the agent's workstation to the Aspect CallCenter ACD.

The adapter contains an audio speaker and dual headset jacks for agents to plug in their headsets (see graphic, page 17). When a call arrives, a link between the tra-

ditional TeleSet interface cards inside the ACD and the agent's adapter allows the adapter to perform the audio functions of a telephone while statistics about the call appear on the agent's screen.

For outbound calls, the process is reversed, with the agent clicking on a speed-dial directory or just typing in the phone number.

PC bypass controls on the WinSet adapter enable agents to keep function-

ing even if their PCs go down. Aspect did not want to leave call-center administrators vulnerable to a single point of failure by making the adapter an internal PC card, explained Michael Broyles, director of marketing for Aspect.

The WinSet adapter costs \$625 per agent and the software costs \$195. The entire package will be available next month.

©Aspect: (408) 325-2200.

Cabletron

Continued from page 17

thesis vision of virtual networking. The effort was designed to build industry support around Synthesis and SecureFast VNS and establish them as de facto standards (NW, March 27, 1995, page 138).

SecureFast VNS is Cabletron's software for configuring switched virtual networks. Synthesis is Cabletron's architectural blueprint for virtual nets that includes routing, switching and shared-media LANs.

But to date, Cabletron has not announced any such partners. Company officials, though, claim that the program is still alive and that partners are beginning to line up.

"We do have a couple in the pipeline right now," said Michael Skubisz, director of product marketing at Cabletron. "But at this point, I can't give you names because either the contracts aren't signed or I don't have whole commitments from them yet."

Cabletron has four vendors in the queue for the partners program, Skubisz said. The program has been slow getting off the ground because Cabletron spent the last year transitioning SecureFast VNS from a package running on a centralized server to one that runs on distributed switches, he said.

The effort required for that project forced Cabletron to temporarily table the partners program, he said.

But now that that's complete, the program has been resurrected — with a new twist. Cabletron next month will post SecureFast VNS software on the World-Wide Web, making it freely available to interested parties, according to Skubisz.

Putting it on the Web

SecureFast VNS firmware for switches and applications for virtual LAN management will be posted on the Web, he said.

Beta or prerelease versions of SecureFast VNS will be available free of charge, but registered versions will carry a price, he said.

Whether this attracts any parties to the Synthesis partners program or not is immaterial, analysts said. End-user implementation is where the rubber meets the road, and Cabletron seems to have some momentum there.

"It is very clearly a proprietary, Cabletron-only technology that they're not getting other people to buy into" through the partners program, "but we're seeing a lot of interest on the part of big enterprises in that architecture," said David Passmore, president of Decisys, Inc. in Sterling, Va. "It's showing a number of our larger clients who look at this and see that this goes way beyond the capabilities of virtual LANs in allowing people to control their campus and LAN environment."

Users are less concerned with Cabletron's inability so far to garner support from the vendor community for Synthesis and SecureFast VNS; rather, they acknowledge that it and every other virtual networking implementation from other major vendors are proprietary and likely to stay that way, Passmore said. ■

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Briefs

■ **The Federal Communications Commission** is giving all carriers in California one more delay — until July 1 — to prepare for delivery of **national caller ID**. Switching problems and customer education requirements imposed by the state have repeatedly held up introduction of the service there.

In a statement, FCC Common Carrier Bureau Chief Regina Keeney said Pacific Bell and other California carriers could have moved more quickly to meet the technical and legal requirements, and she threatened enforcement action against any carrier that is not ready this time. "The commission will not tolerate further delay," Keeney warned.

■ **The Federal Communications Commission** earlier this month proposed to require that **long-distance carriers** providing service at public pay phones automatically **disclose their rates** at the time the call is made, if those rates are well above the industry norm.

■ **AT&T Wireless Services** said it has launched its **Wireless Circuit Data Service** — **analog cellular service** with error-correcting modem pools — in 35 new markets in California, Florida, Nevada, Oregon, Pennsylvania, Texas and Washington.

■ **The UniSpan Frame Relay Consortium** has expanded its reach to cities in Hungary, India, Japan, Russia and Singapore.

■ In an effort to get its cable TV network prepared to offer **high-bandwidth** and telephony services, **Time-Warner Cable of New York City** is installing 50 miles of AccuRobbon Cable from Bell Laboratories.

■ **The Federal Communications Commission** has approved **Bell Atlantic Corp.'s** plan to offer **Internet access**, which means users in parts of the Bell Atlantic region can order Internet access from the phone company along with phone services, including regular voice lines and ISDN.

New business phone services to hit the Web

By Joanie Wexler

Carriers who oppose 'Net telephony better brace themselves: Business phones, PBXs and ACDs will be jumping on the World-Wide Web this summer.

If Web phone pioneer NetSpeak Corp. succeeds, Internet calling will soon move beyond individuals trying to save an occasional buck on long-distance calls. That's because NetSpeak — one of several software makers under attack by America's Carriers Telecommunication Association — is building a whole business phone system for the Web.

The \$49.95 Windows-based WebPhone 2.0, which is available now, offers typical business fea-

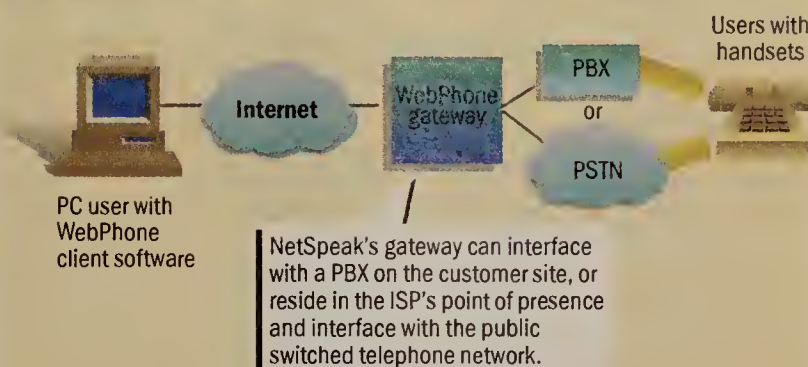
tures such as caller ID and conferencing. Voice mail is recorded directly into the user's PC or is forwarded from the Internet service provider (ISP).

The interface looks like a cellular flip-phone keypad. This makes it "easier to use than other ['Net phone] products," said Scot Combs, vice president of network programming at NetRadio Network Corp. in Minneapolis, a WebPhone customer.

But the WebPhone is only the tip of the telephony iceberg. Next month, NetSpeak will roll out private branch exchange software for switching calls among intracompany IP addresses and is adding auto-

IP meets the telephone

NetSpeak's gateway will allow WebPhone software and traditional telephone handsets to communicate.



matic call distributor (ACD) capabilities. Customers must run NetSpeak server software on Microsoft NT or Solaris servers to make use of the PBX and ACD functions.

Such a system could usher in a new wave of Web applications. For instance, consumers could

browse a home-page catalog of a company using WebPhone PBX. If they needed to talk to an operator, they could click to launch a phone call to the company's call center, said NetSpeak President Robert Kennedy. A user could also download WebPhone from that vendor's Web site.

Also next month, NetSpeak will launch a 'Net-to-PSTN gateway so Web and public switched telephone network users can make calls to each other.

Still, users are advised not to throw out their handsets just yet. "Packet switching works well when there is no contention for available bandwidth," noted Bruce Thatcher, president of TelCon Associates, Inc., a telecommunications consulting firm in Overland Park, Kan.

Sprint discovers new ally in local invasion

By David Rohde
Orlando, Fla.

After nearly two years of relying on cable TV partnerships to invade the local exchange, Sprint Corp. is finally turning to an old asset that its rivals do not have: its own local phone companies.

tral Florida market, where Sprint shares the territory with BellSouth Corp. through its wholly owned phone company known until recently as United Telephone Co. (now simply known as Sprint).

If the venture is successful, users stand to benefit from a single point of contact. It should also result in lower prices than users would have to pay to mix and match Sprint, BellSouth and interexchange carrier leased lines into a coherent WAN design.

In a recent filing with the Federal Communications Commission, the company disclosed it will charge fixed fees that are much lower than

and optional features such as multiplexing (see graphic).

The pricing should attract users drawn to metropolitan fiber rings built by competitive access providers, according to Melissa Closz, SMNI general manager.

SMNI is laying fiber in the BellSouth territory and has already installed a switch there, Closz said. The company will also lease network capacity from BellSouth.

Sprint officials said discussions are under way to extend the SMNI offering outside central Florida, but they cautioned that conditions may not be as well suited in other key markets.

The Florida opportunity arose after the state passed a telecommunications reform measure last year and SMNI won certification as a full-fledged carrier. Most of Sprint's other existing local operations are in markets smaller than the Orlando area.

Sprint's original national local market entry strategy — built around an alliance with three cable TV companies — has floundered ever since the partners dropped a financial agreement for telephony-enabling cable facilities (NW, Feb. 19, page 8). ■

Carve your own dedicated path

Sprint's new Sprint Metropolitan Networks venture charges highly favorable rates for dedicated transport in Florida.

Bandwidth speed in bit/sec	Monthly channel termination charge	Monthly fixed mileage charge
64K	\$50	\$80
128K	\$60	\$105
256K	\$70	\$110
384K	\$75	\$125
1.544M	\$77	\$164

The recurring channel termination charge applies to each user's point of termination; the fixed mileage charge is assessed once per two-point or multipoint circuit. Multiplexing a DS1 circuit down to 24 DS0 channels costs \$200 per month. Installation charges are extra. Term discounts are available.

SOURCE: SPRINT METROPOLITAN NETWORKS, INC., ALTAMONTE SPRINGS, FLA.

The carrier's local telephone division has quietly formed a subsidiary known as Sprint Metropolitan Networks, Inc. (SMNI) to offer transport services off high-speed fiber rings.

SMNI's first target is the cen-

typical private-line charges based on the distance between the user site and the carrier's central office. Instead of mileage, the key variables are the speed of the user's circuit, the number of points of termination

- Dial up more info on Network World Fusion, including:
- A look at efforts to develop Internet telephony standards
- Links to sites covering the controversy over Internet phone calls
- Downloadable telephony software

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For example, ProStar Plus Internet, a Seattle-based ISP has tested the WebPhone over a T-1. "The voice quality does come and go, based on usage on the Internet," said Robert Michnik, ProStar owner.

A beta version of WebPhone can be downloaded at <http://www.netspeak.com>. ■

WAN MONITOR

A bumpy road to bundling nirvana

MCI's new MCI One service, currently in heavy advertising rotation, promises a complete solution to all your telecommunications needs — a single box with a single bill.

An invoice that includes all your communications charges (local access, long distance, Internet, cable TV, cellular, paging and voice mail charges) sounds like a win for both customers and providers.

However, there will be roadblocks on

the road to service bundling nirvana. For consumers and small businesses — the first ones to be targeted for integrated billing — there will be many issues.

Sticker shock is one. Somehow, paying five companies \$20 per month does not seem as expensive as paying one company \$100 per month. And what happens if you make a partial payment? Will they cut off all services or only certain ones?

For the large business user, integrated

billing raises a different set of issues. No large business is afraid of writing multiple checks for telecommunications services. But they are concerned with the overall cost of telecommunications.

Recently, TeleChoice polled 200 *Network World* readers on the topic of carrier billing and reporting. Readers were asked how deregulation and the resulting service bundling would affect them. There was one prevailing fear — confusion resulting from the changing environment — and one prevailing hope — lower costs.

This confusion will stem from a plethora of new offers that feature cross-service discounting. While you may have done a thorough job of comparing AT&T to MCI and Sprint, now an RBOC is offering a package that includes local, long-distance and cellular services. Not only that, they can provide a CD-ROM with a record of your usage for reporting and analysis.

Lower overall cost seems to be the primary reason, among readers, that someone would even consider tackling the issue. Integrated billing only enters the picture when people consider possible savings in administrative overhead, and when they consider how they will keep track of expenses when usage levels of any one service may impact the cost of another.

Unfortunately, the only way that you are likely to be able to get that mythical CD-ROM with all your monthly data on it is to go with a single retail provider for those services. Providers are going out of their way to keep electronic billing information a proprietary function so that it adds value to their bundle and not another carrier's.

What types of carriers will be the most successful in the bundling game? Based solely on customer satisfaction with carrier billing, the IXCs scored higher in our survey than the LECs did. However, local services are inherently more complex to bill for than long distance, and the gap was smaller than when we asked readers the same question in 1993.

All providers are rushing to upgrade their billing systems to support multi-service packages. In the beginning of 1997, we will see integrated local and long distance (the big pieces to be integrated) and continue to see wireless and data services rolled into umbrella packages.

In the short term, expect the headaches of reevaluating all service types. In the long run, expect to see some services, such as cellular, figuratively disappear into blanket service packages.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and heckart@telechoice.com.



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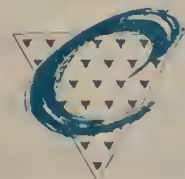
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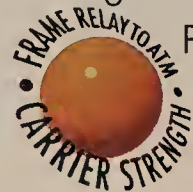
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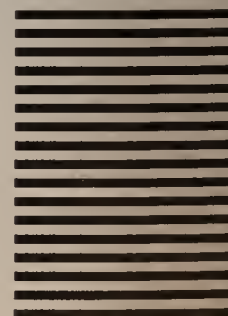
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Briefs

■ **IBM** has announced a version of its storage management software that supports Windows NT servers. Version 2.1 of its **ADSTAR Distributed Storage Manager (ADSM)**, like previous editions, automates data archiving and retrieval as well as backup policy scheduling.



ADSM now supports nine server platforms including Solaris, HP-UX and AIX, as well over 30 different clients. The software will be available in September. Pricing information was not available.

IBM: (800) 442-6773.

■ **Xircom, Inc.** of Thousand Oaks, Calif., last week announced a PC adapter card for connecting portable PCs to **100Base-T** networks. The CreditCard 10M/100M bit/sec Ethernet adapter automatically detects port speed to provide access to either 10M or 100M bit/sec networks. The adapter is priced at \$269 and is available now.

Xircom: (805) 376-9300.

■ **Hughes Network Systems, Inc., Cisco Systems, Inc. and Helius, Inc.** this week will announce the first LAN-based shared Internet access product resulting from their year-old partnership. **DirectPC for NetWare** will let Novell, Inc. customers distribute messages, files or software to multiple sites simultaneously via a satellite connection to the 'Net.

The offering comprises DirectPC, Cisco's Internet Junction IPX-to-TCP/IP gateway for shared Internet access, and client and server security software from Helius. DirectPC for NetWare will be available in August and cost \$2,300 for a five-user NetWare LAN.

Hughes: (301) 428-5500.

Getting to the bottom of the clustering clutter

Sun's CTO says SMP and clustering complement each other.



Symmetric multiprocessing (SMP) and clustering are terms about which

most server company executives and customers can't say enough these days. Much of the attention has been focused on vendors in the Intel Corp. and Windows NT camp, which are charging into a market RISC and Unix vendors have been in for years. Staff Writer Ben Heskett recently asked Greg Papadopoulos, chief technology officer at Unix giant Sun Microsystems Computer Co., for his views on this increas-



Sun's Papadopoulos

ingly competitive market segment. Papadopoulos has co-founded three companies, including PictureTel Corp., taught at the Massachusetts Institute of Technology and served as a senior architect at Thinking Machines, Inc.

Could you address SMP and clustering as they relate to applications and scalability?

If you want to scale up the computing resources [processing, memory, I/O] applied to an application, there are two realistic choices: SMP or clustering/MPP. I lump clustering and [massively paral-

lel processing] together because they are the same logical architecture as far as the application is concerned. The bottom line is that SMP is a much more simple model of parallelism for both the application developer and the administrator because it is built on the fundamental hardware premise that any processor should be able to efficiently reference any memory and disk. For clustering/MPP, the developer and administrator have to be concerned with the funda-

mental nonuniformity of the hardware design; only a small fraction of the memory and disk is seen by a processor, and communication with remote memory and disk is considerably more expensive.

What do network operating systems and applications need to do to be optimized for an SMP machine? Is it a simple case of providing multithreading or are there other areas where a NOS

See Cluster, page 28

3Com rolls out smart NICs

By Jodi Cohen

Santa Clara, Calif.

3Com Corp. last week introduced Ethernet and Fast Ethernet network interface cards that can figure out when and how fast to transmit data based on the network's condition.

The EtherLink XL 10M bit/sec and Fast EtherLink XL 10M/100M bit/sec PCI-based adapters provide full Simple

traffic through the network," said Jim Jones, product manager at 3Com.

3Com's new features, dubbed DynamicAccess, allow the XL cards to communicate with a switch or router to help optimize the data throughput across the net. Previously, adapters played a passive network role where the card was oblivious to which device it was connected.

The network interface cards now can interact with other net devices to control multicast traffic, which can degrade performance. Also, the cards can realize that they are dealing with a different application like video and be able to provide special enhancements — such as prioritizing packet delivery — for that type of application.

3Com's new cards will compete with Intel Corp.'s recently unveiled software-enabled adapters, which let customers take advantage of new net operating system releases.

"This is much more comprehensive than Intel's recent Adaptive technology announcement," said Diane Myers, senior analyst at In-Stat, a consultancy in Scottsdale, Ariz. "3Com's cards have many more integrated features that allow them to take advantage of switched connections to the desktop."

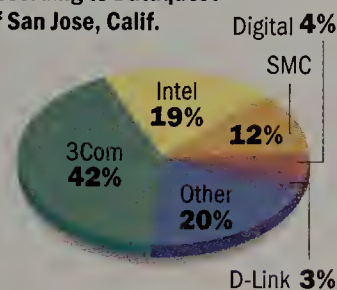
3Com this year plans to provide many of these features as free software upgrades to its installed base of more than 25 million adapter cards, Jones said.

The EtherLink card costs \$99, and the Fast EtherLink XL adapter costs \$145. Both will be available this summer.

©3Com: (408) 764-5000.

Notable NIC numbers

3Com dominated the 1995 worldwide market for 10M and 10M/100M bit/sec PCI adapter cards, according to Dataquest of San Jose, Calif.



Based on 23.5 million units shipped.

Network Management Protocol and Remote Monitoring support, as well as multicast traffic control, which allows the cards to better interact with hubs, switches and other network gear.

Most adapters, including 3Com's, have been designed to transmit data as fast as possible and whenever allowed. 3Com cards now actively analyze network traffic and make decisions about when to transmit in order to get higher throughput and lower CPU utilization.

"Instead of just focusing on how many bits we can spit across the bus and into the host system, we looked at how the adapter could help improve the flow of

Cheyenne shores up NT servers

By Ben Heskett

New York

Cheyenne Software, Inc. this week will introduce an update to its Windows NT server backup software that is more flexible and reliable than the previous version.

ARCserve for Windows NT 6.0 features an image-based data restoration option that lets administrators perform quick backups after unexpected server shutdowns, without having to reinstall software. The administrator uses the option to take a snapshot of a big chunk of data on the server, store



This makes server backups more foolproof because data gets copied to multiple tape drives instead of one. A LAN administrator for a large medical center in the Midwest was particularly pleased with the RAID and imaging options in the new version. With servers at his facility pushing 100G bytes of storage, fault tolerance and speed of backups are two important criteria.

Both of the new features help bring the NT version of ARCserve closer to the market-leading NetWare edition.

ARCserve 6.0 for Windows NT edition for multiple server sites is priced at \$1,395. The single-server edition costs \$795. The RAID option is priced at \$1,995, the image option at \$995 and the recovery option at \$495.

Separately, competitor Seagate Storage Management Group will use PC Expo to introduce Seagate ExecView, an application that lets companies manage and monitor an unlimited number of servers running Backup Exec for Windows NT or NetWare from a single console.

©Cheyenne: (800) 243-9462; Seagate: (407) 333-7500.

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it on tape and copy it, rather than doing file-by-file copying.

The product, being announced at PC Expo, also gains support for RAID Levels 0, 1 and 5.

Microsoft

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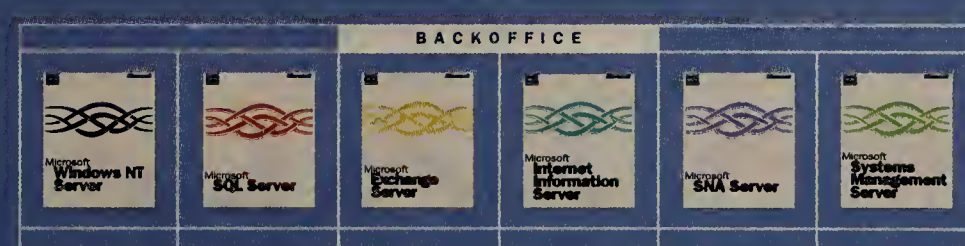
Rich text. Embedded graphics. Unlimited enclosures. It seems users have had every indulgence software makers can think of. Isn't it time someone thought of your needs? We have. And we think you'll be relieved to learn that, finally, there's a truly reliable messaging server now shipping. One with all the performance, security, and tracking features an administrator could want.

Microsoft® Exchange delivers more messages faster and more reliably than any other mail or groupware system. It's also more secure. With built-in features like encryption and digital signatures, unauthorized access is all but impossible. There are also built-in tracking tools that let you locate messages anywhere in the system. And in the event your system ever loses connection, Microsoft Exchange will automatically identify the source, notify you, and even fix it. Most importantly, all of this is possible over any network – your intranet or the Internet.

Collaborative business solutions can also be deployed with confidence. With Microsoft Exchange's powerful messaging infrastructure, you'll have the required reliability for group scheduling, bulletin boards, and customer tracking applications. Administration and integration are equally uncomplicated. The entire system can be managed from a single desktop. And, unlike other systems,

Messaging Requirements	Microsoft Exchange Server v4.0	Novell® Groupwise 4.1	Lotus® Notes r4.0
Scalable to widest range of hardware*	YES	NO	NO
Integrated Centralized Management Tools	YES	NO	NO
Integrated Internet Access (SMTP/MIME)	YES	NO	NO
Integrated X.400 (1984&1988)	YES	NO	NO
Built-in Group Scheduling	YES	YES	NO
Built-in Groupware	YES	NO	YES

Microsoft Exchange's multi-protocol open architecture provides native SMTP- and X.400-support, so it can peacefully coexist with almost any e-mail system. It even has built-in migration tools for Microsoft Mail, cc: Mail™, PROFS®, DEC All-In-1™, and Verimotion Memo. So now you have every reason to make the move. And every assurance that it'll be worth it. To learn more, call (800) 426-9400, Dept. A234. Or visit our Web site at <http://www.microsoft.com/exchange>.



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Cluster

Continued from page 25

or application can be tweaked to provide greater performance?

Multithreading is the primary opportunity for a single application to obtain scalability on an SMP machine. By modifying an application to perform asynchronous I/O using kernel threads, an application can see significant perfor-

mance improvements. This is the simple trick of overlapping I/O.

Is SMP a step on the way to clustering, or is it more of an either/or decision for most customers?

SMP is a terrific first step to clustering. We recommend that SMP be used for scaling the application performance as much as possible, while clustering be used for high availability. Thus, a cluster of two

large SMPs can be an ideal mix of high performance and high availability. Even if performance is the primary concern, starting with a single SMP, scaling it up and then expanding to a second, third, fourth, etc. is an excellent growth path.

Think of SMP machines and clusters as providing two knobs. The SMP knob scales the size of a node, while the cluster knob scales the number of nodes. By all of the discussion above, it should be clear

that we believe it is best for developer, administrator and user to turn the SMP knob as high as practical and then turn the cluster knob as additional performance and/or availability is required.

From a technological standpoint, do RISC/Unix vendors have an edge vs. Intel/Windows NT vendors given their SMP experience?

If you really want this distilled, it's this: SMP machines are harder to build, but easier to develop on and deploy. Clusters/MPP machines are easier to build, but harder to develop and deploy. The value of an SMP machine and scalable O/S is that it takes care of the hard stuff.

Are Pentium Pro machines running WinNT a serious challenge?

Well, the p6 systems barely get to efficient four-way implementations. Thus, the p6/NT community has no choice but to cluster the machines to attempt scalable systems. Here is a simple question: Suppose you needed a system with 1,000 disks, 100 processors and 20G bytes of memory, and you were given two configurations to choose from: A) 25 four-processor systems, each with 40 disks and 800M bytes of RAM, or B) Four 25-processor systems, each with 250 disks and 5G bytes of RAM. Which do you prefer? Almost invariably B. It will be much easier to develop for and administrate.

Big SMP machines are valuable because they are easier to develop, deploy and manage than an equivalently sized cluster of smaller nodes. The Intel/NT camp has a lot of catching up to do to accomplish the kind of workaday scaling that is commonplace on well-engineered Unix-based SMP machines. ■

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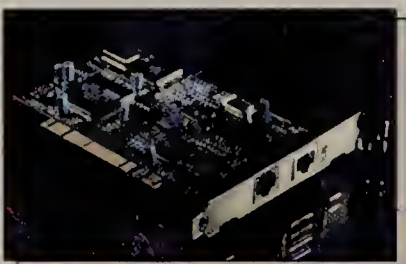
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BusinessBriefs

Whittaker Corp. last week named **Michael Thurk** chief executive officer of the Whittaker/Xyplex communications division. Previously, he was a senior vice president at General DataComm Industries, Inc. In his new position, Thurk will lead a team of 700 people in the production of remote access, hub and switching devices. Whittaker acquired Xyplex from Raytheon Co. in March for \$117 million.

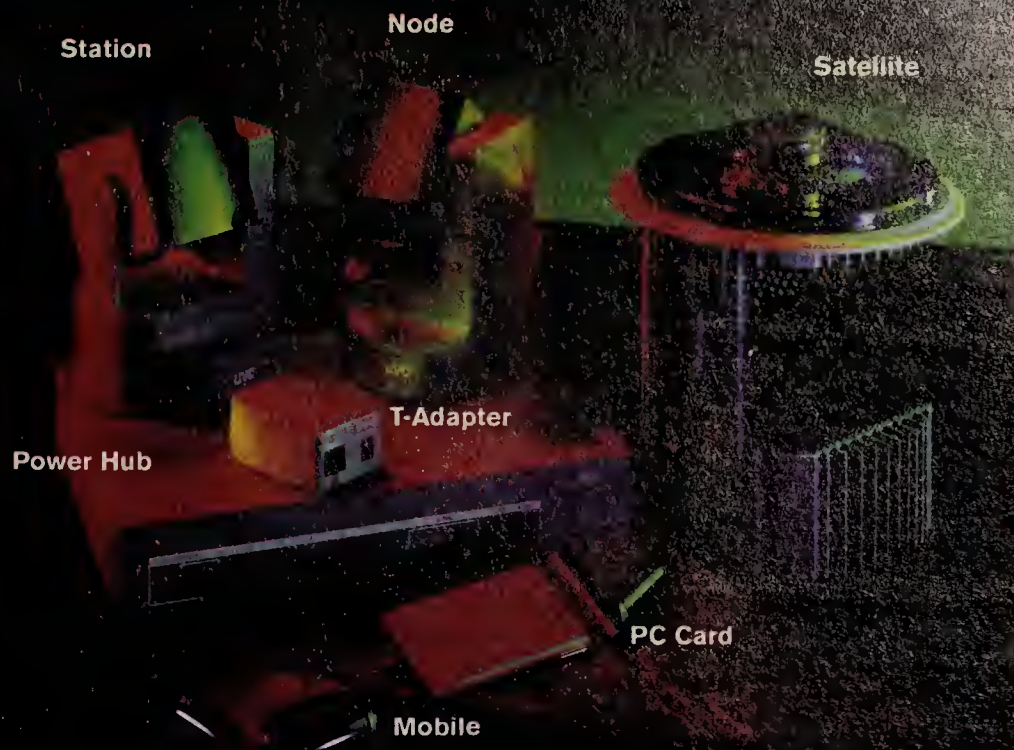
Workgroup Ethernet vendor **Lantronix** last week appointed **Craig Johnson** as director of product marketing. He joins Lantronix from Xylan Corp., where he was director of worldwide service and support. In his new position, Johnson will focus on leading development and gaining prominent marketing exposure for the Lantronix product line.

Hub and LAN switch vendor **CNet Technology, Inc.** has announced an **Internet division** that will provide customers with products for intranet and Internet connectivity. The division's first products will include multiprotocol routers, LAN and Asynchronous Transfer Mode switches, as well as ISDN adapters and routers. In addition, CNet will introduce TCP/IP products.

All products will be unveiled by year-end.

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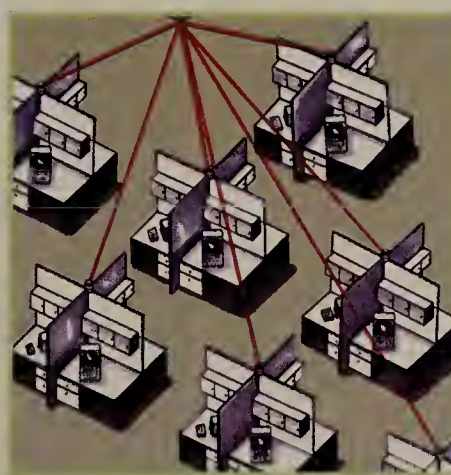
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1. 360° ceiling-mounted Satellite-Node configuration supporting multiple users
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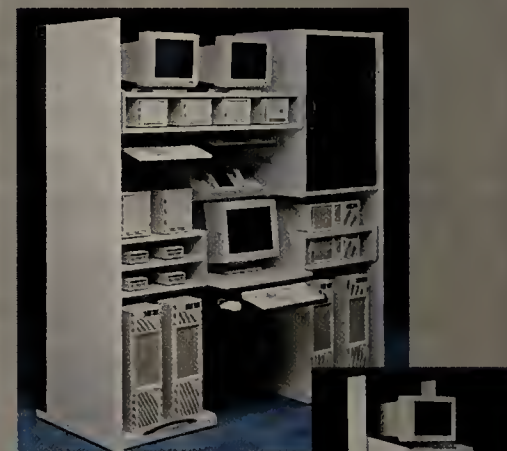
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WIRED WINDOWS

Vendors churn out the NOS news

IBM, Microsoft Corp. and Novell have made lots of announcements over the past few weeks. None of them were of the earthshaking variety, but many were interesting for what they didn't say.

IBM came out of Comdex/Spring '96 with a load of product announcements for the Windows NT and Windows 95 platform, but with little to say about Warp Server. DB2 for Windows NT (which will even carry the "Designed for Microsoft BackOffice" logo) and DB2 for Windows 95 led the way.

Microsoft proclaimed its Internet security strategy — although I'm not sure anyone was waiting for the proclamation. Certainly not the Internet groups that

have been working on various security strategies for the past few years.

The company also took the wraps off Normandy, which appears to be a collection of previously announced or released products

clumped together as an Internet service provider (ISP) solution. Few ISPs have jumped up with an endorsement.

CompuServe, Inc., on the other hand, treated it as the dawning of a new age — probably because its vaunted Internet software has been performing so abysmally in beta tests.

Microsoft also admitted it was wrong about its implementation of file and print services for NetWare in Windows 95. You'll remember that this supposedly allowed a Windows 95 machine to advertise on NetWare as a file or print server.

The Windows 95 machine advertised itself as a NetWare 3.X-compatible server but only responded to NetWare 2.X calls. After much back and forth between the networking enemies, Novell consented to

show Microsoft how to do it right. This could be because of the loud complaints from NetWare administrators about the shortcomings in Novell's Client32 for Windows 95, which has no file and print

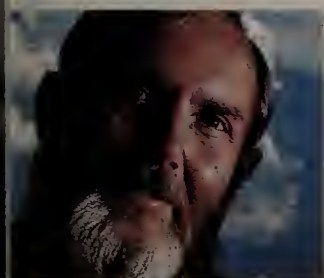
services or remote registry. This appears to be a face-saver for both companies.

Details of Microsoft's once-heralded Nashville release of Windows 95 are also coming out, and it amounts to virtually nothing for the already installed base. The new file system, Fat32, won't be available to the general public; it'll just sneak into new OEM versions of the operating system. So will most of the other changes.

Finally, Novell revealed that its next

version of NetWare, dubbed Green River, will carry the 4.11 version number — a .01 upgrade from the current 4.1. Even so, it appears to offer more of an increase than Windows NT 4.0 does over 3.51 — but then, Microsoft was never very good with numbering systems.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.



Dave Kearns

Tip of the week

This week, I offer up online references for Windows 95. If you connect to Network World Fusion (<http://www.nwfusion.com>), click on the Forum logo, and choose Their Side and Wired Windows, then you won't even have to type anything — just click on the links in the text of this column.

Win95-L Windows95 FAQ

<http://walden.mo.net/~rymabry/index.html>

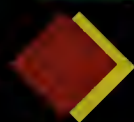
<http://www.primenet.com/markd/win95faq.html>

Win95 Networking FAQ 96

<http://www-leland.stanford.edu/~win95netbugs/faq.html>

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NET RESULTS

Remote LAN access market proving 'magnifique'

When compiling a list a great places to be in the springtime, you'd be hard-pressed to top Paris. And when compiling a list of the hottest LAN topics, you'd be hard-pressed to top remote LAN access.

Fortunately for us, the two were combined earlier this month at our annual European network conference.

In a part of the world where widespread availability of ISDN is the norm, remote access is spreading as rapidly as an

Alaskan brushfire. And as is the case in the U.S., many customers are struggling with how to accommodate the increasing number of remote end users that need to be connected.

According to figures compiled by Gart-

ner Group's remote LAN access gurus, the market value of new remote LAN access equipment and services will exceed \$500 billion — that's right, billion — by the year 2000. This is based on more than 55 million users being regular telecommuters in a small office/home office network environment. And these are conservative figures.

If your company doesn't have a remote LAN access policy in place by now, then it's definitely going to need one in the short term. Remote access is like the proverbial 800-pound (or 363 kilograms if you're in Paris) gorilla that's knocking on the door. It won't wait until you open the door; it'll just come crashing through.

A number of factors have led to this increased need for remote access, including environmental laws requiring companies to foster work-at-home programs; the need to accommodate and attract the best talent in your industry by eliminating the relocation issue; the desire to reduce company expenses by eliminating office space rental and utility bills; the hope of increasing employee productivity and effectiveness by reducing commuting times and allowing users to work on mild sick days, during snow storms or while tending ill family members; and the need to better support workers that are mobile or travel frequently.

The good news is that the technology in this space has matured, giving organizations flexibility in setting up remote LAN access systems. The bad



Skip MacAskill and Melinda Le Baron

news is that setup costs can be quite steep. Our research shows that the total cost of ownership for a full-time remote access user will be up to 52% greater than for a LAN-connected user over the next five years.

The trick is to be as prepared as possible to best support these remote LAN access users. Here's a list of reasons why companies' remote access plans fail:

- Long-term manageability is sacrificed for up-front component cost reduction.
- Lack of security.
- Lack of control over legacy access points.
- One is solution forced on heterogeneous workgroups.
- IT and business units don't reconcile how expenses will be charged.
- Lack of supervisory support for remote workers.
- Personal data and files on corporate platforms create expired and security-risk data sources.

If done correctly, remote LAN access investments can bring a number of benefits to end users and pay for themselves in about 15 months.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.

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Briefs

■ **FTP Software Canada, Ltd.** in Calgary, Alberta, is shipping KEYview 5.0, its Windows-based file-viewing utility for Internet and electronic mail applications that now supports multimedia files and can work as a plug-in to Netscape Communications Corp.'s Navigator browser.

The new version may also be used to zip files up and convert HTML documents to other formats. In addition to Web browsers, the software integrates with E-mail clients and document management applications. Pricing is \$49.95 per user.

FTP: (403) 735-8900.

■ **Fabrik Communications, Inc.**, a San Francisco-based Internet electronic mail service provider, last week announced the **Fabrik Service for Lotus Development Corp.'s Notes**. The service connects LAN E-mail users to the Internet, X.400 and commercial E-mail networks. The company is also testing a service to connect users of Microsoft Corp.'s Exchange that will be ready by the middle of next month.

Pricing is \$60 per month for each external connection (plus a 20 cent charge per outbound message).

Fabrik: (800) 732-2745.

■ **Bradmark Technologies, Inc.** of Houston has released Performance Monitor 2.0 for Oracle, which lets administrators set up alarms and alerts for hundreds of Oracle Corp. database performance measures.

The new version can monitor unlimited servers, offers a drill-down capability to quickly identify problems and can report on selected events continuously through predefined events and alarms. Contact the vendor for pricing information.

Bradmark: (800) 275-2723.



BeyondMail gains Internet appeal

Coordinate.com also adds directory services and remote access features.

By Barb Cole
Chicago

Coordinate.com has taken the wraps off BeyondMail 3.0 Internet Edition, which adds directory services, remote access and other enterprise-level services to a standards-compliant Internet mail client.

The new version, announced here last week at Internet Expo, has a four-tiered directory that lets users locate other users by employing their choice of personal, workgroup, enterprise or global directories.

The upgrade is aimed at companies that are retooling their electronic mail networks to support Internet protocols but still want to take advantage of high-end mail features not available in most pure Internet mail offerings, said Eugene Lee, director of marketing for Coordinate.com. "Users have traditionally had to make a trade-off between [complying with Internet] standards and [E-mail] functionality," he said.

Coordinate.com is what was previously known as the Internet software division of Banyan Systems, Inc. Thus, BeyondMail's enterprise directory is based on Banyan's StreetTalk and its

global directory is based on the Switchboard Internet directory.

Version 3.0 of BeyondMail also supports the Lightweight Directory Access Protocol

(LDAP), an X.500-like directory.

BeyondMail 3.0 is a native Simple Mail Transfer Protocol/Post Office Protocol 3 client that complies with Multi-purpose Internet Mail Extensions (MIME), a standard for sending attachments via the 'Net. By year-end, the software will support the Secure/MIME security protocol. Support for Internet Message Access Protocol and Messaging Application Programming Interface is also planned.

"BeyondMail [3.0] is well-positioned to provide mail based on open, Internet standards," said Geoffrey Bock, an analyst at Patricia Seybold Group in Boston. The software's directory and rules-filtering capabilities set it apart from other products of its type, he said.

Other improvements include the following:

RealityCheck

Product

BeyondMail 3.0

Company

Coordinate.com

The benefits

- ▲ Supports SMTP
- ▲ Can handle graphics and compound documents within mail messages
- ▲ Runs on multiple client and server platforms

The drawbacks

- ▼ Lacks MAPI support
- ▼ Lacks native IMAP support

The user view

"The learning curve [for BeyondMail] is flat, and it has some features that neither Eudora nor Navigator have. For example, you can set up multiple user in-boxes, which is really important if you have several people sharing a computer." Jim Metcalf, trainer, Texas Education Network, Austin

Uniplex software blends document management and Web servers

By Barb Cole
San Mateo, Calif.

Uniplex Software, Inc. has rolled out an add-on for its document management system that companies can use to manage information stored on Web servers and corporate intranets.

The Dynamic Web Repository software resides on a Web server and works with the company's onGO Document Management System, making documents in the DMS accessible via Web browsers.

The software is aimed at DMS customers that want to distribute documents via the Web, as well as companies looking to manage existing Web content. It includes features that are either missing from most Web servers or must

be manually added by Webmasters.

For example, onGo can ensure availability and accuracy of documents via its online backup and built-in version control features. As new versions of existing documents are added to DMS, they automatically replace older versions of the document and are passed to the Web browser.

In addition, the DMS automatically converts documents to HTML so they can be posted to the Web repository in their original file formats.

Using DMS to handle Web content is promising because "companies are demanding highly secure environments for

See Uniplex, page 38

■ Customized message folders that can be sorted by name, subject, date and message type.

■ Remote access enhancements for downloading specific messages based on user-defined criteria.

■ Support for Microsoft Corp. ActiveX controls, enabling customers to embed multimedia context and compound documents in mail messages.

BeyondMail 3.0 runs on Windows, Macintosh and Unix clients and servers. It will ship this fall; the vendor has not yet decided on pricing.

© Coordinate.com: (617) 398-7900.

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Middleware from the Middle East

Precise Software comes to the U.S. with connectivity tool.

By John Cox

Braintree, Mass.

Precise Software Solutions, Inc. is a company on the move.

Not only did the Israeli firm recently relocate its headquarters to the U.S., but it has released a new version of its communications middleware aimed at spanning client/server, legacy and Internet applications.

Precise/CPE 3.0 includes support for message queuing, a set of Internet enhancements and support for the Java programming language, according to Daniel Haley, Precise's president.

Like other message-oriented middleware, Precise/CPE provides a uniform software layer that gives client/server applications access to other applications regardless of whether they reside on PCs, servers or mainframes. Also, like its counterparts, the product is based on a messaging scheme

that includes an API and applications services.

The Precise/CPE 3.0 API supports some 40 operating systems

PRECISE SOFTWARE SOLUTIONS

Headquarters: Braintree, Mass.

Founded: 1991

Primary product: Precise/CPE Version 3.0, multiplatform software for application-to-application interoperability

What's new: Message queuing, support for DCE and Java, Internet access, data encryption, and directory services access via the Lightweight Directory Access Protocol

Price: Depends on number and type of servers; averages between \$75,000 and \$150,000

Available: August

as well as an array of databases and network protocols. Developers make use of a handful of additional calls that let desktop or server applications call the middleware's services, such as data

See Precise, page 38

SHARED LOGIC

What to do when your apps outgrow your server

Selecting server hardware is one of the most daunting tasks for information systems directors and network managers.

Vendors are wrestling with how to help customers with this problem now,

as the first wave of client/server systems encounters bottlenecks associated with limited processor speed, disk I/O and network bandwidth. The answers vendors are providing include symmetric multi-processing (SMP) servers, massively paral-

lel processing (MPP) servers, clustered servers and a new compelling concept: the generic server.

If you want something that works today, go with SMP.

What's best about an SMP solution is

that you can transparently scale up your servers. No modifications should be required to the application programs or database management systems currently running on single-processor versions of the same operating system. As you need more processing power, you can add processors up to the physical limit of the server that you choose.

MPP servers solve the potential bottleneck associated with the SMP solution: SMP processors must all share the same disk I/O and memory subsystems. MPP servers consist of multiple independent processors, each with its own memory and disk I/O subsystem. The question is, can any software run on these MPP machines?

Certainly. Provided that the software developer had MPP in mind when it built the software. You can get sophisticated MPP database server software from Oracle Corp. (Oracle Parallel Server), Informix Software, Inc. (Extended Parallel Server), Sybase, Inc. (Sybase MPP), and IBM (DB2/6000 Parallel Edition). But by the time you've purchased the proprietary hardware and the database server running on the highly specialized operating system, you've got to ask yourself: Will Her Majesty be willing to fund my next secret mission if this impressive array of technology doesn't work quite right?



Marc Myers

Enter the clustered server, a compromise between SMP and MPP. It's actually a cluster of multiple SMP servers. Again, the application software has to be designed to take advantage of the parallelism. But in the meantime, existing non-parallelized software can take advantage of single SMP systems in the cluster.

The issue with clustering is cost. The technology is still so new that you have to pay for both technology and innovation. If you want to pursue clustering technology, offerings are available from most of the major vendors, including Hewlett-Packard Co. and Digital Equipment Corp.

An intriguing new development in the server wars is the generic server, which I'm sure its innovators over at the Boca Raton, Fla.-based Panda Project would consider an unglamorous, though descriptive, tag. This server relies on a technology called Compass, which was just patented by Panda and allows for the swapping of processors.

For example, on a Panda Project server, you can take a Pentium-based server running Windows 95 and turn it into an Alpha-based server running Windows NT by swapping out two cards and rebooting the machine. Keep your eye on this for the not-too-distant future.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726.

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“OS/2 Warp Server has what it takes to
kick Novell networks into overdrive, and

it all comes on this good-looking disc.”

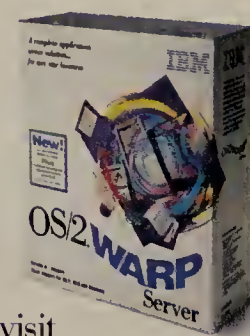
Control

Robert Sanders of Rabbit Enterprizes was just doing his job — finding new ways to boost Novell® network performance. One day, feeling particularly adventurous, he took OS/2® Warp Server out for a test-drive. That's when his eyes opened really wide. Because alongside his familiar Netware® file and print server, he could suddenly run Lotus Notes® and powerful databases. Enable companywide Internet access. And keep the network under control using OS/2 Warp Server's built-in systems management.

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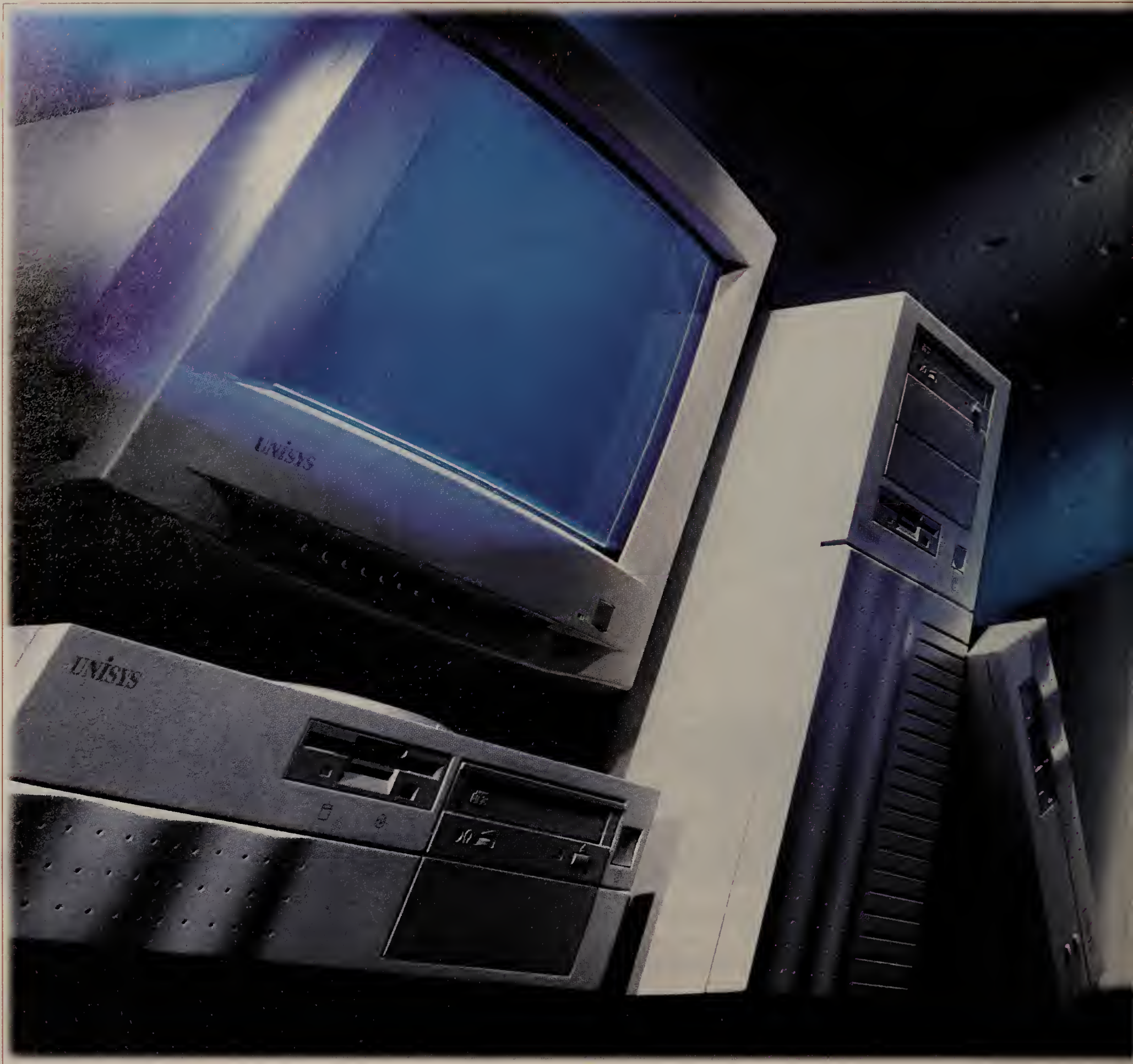
more patchwork services and better network functions for everyone, regardless of desktop OS. And at \$629*, it felt like a bargain.

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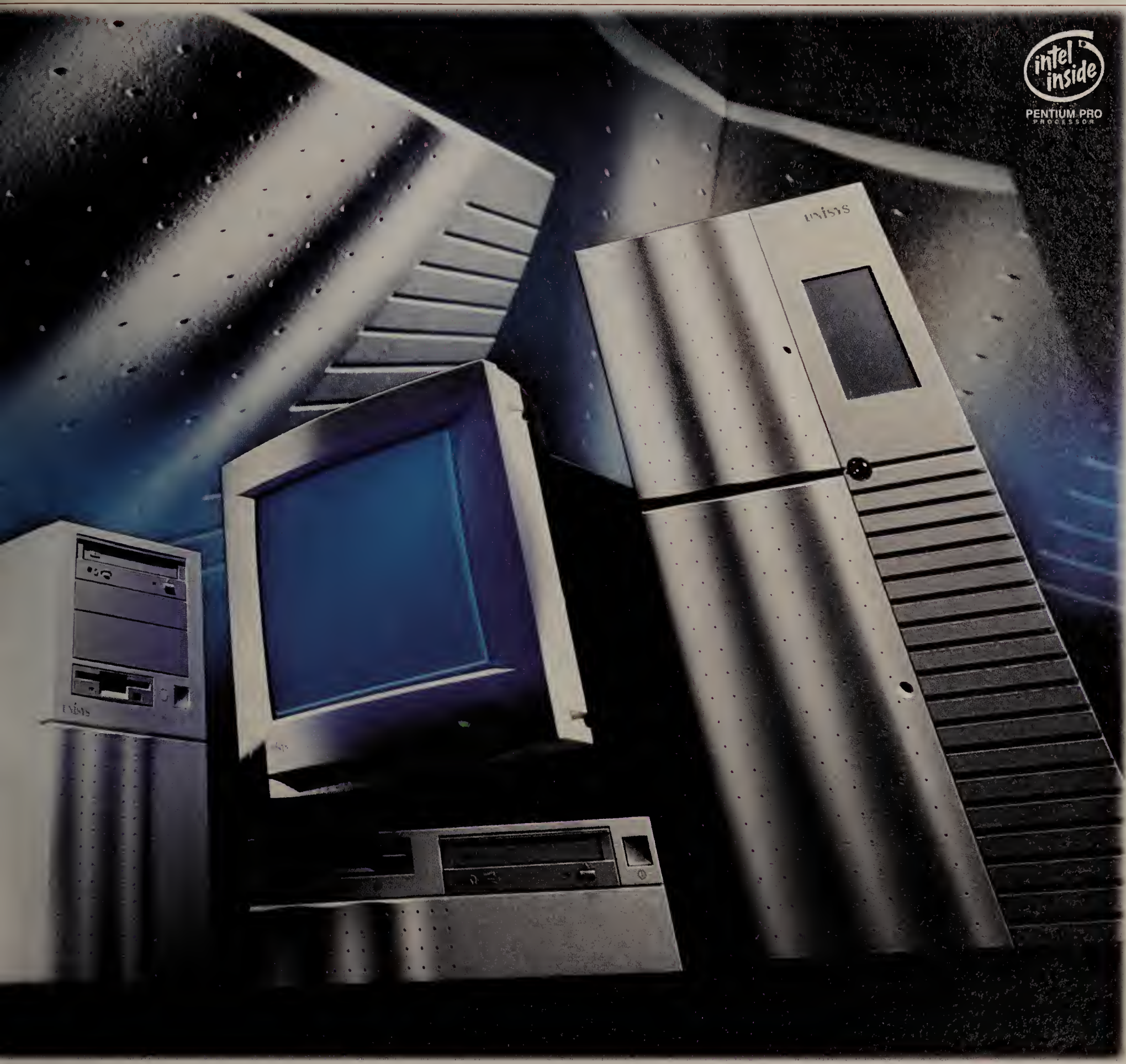
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UNISYS

The Information Management Company

Precise

Continued from page 33
compression.

Precise/CPE is designed for synchronous communications, creating a direct link between applications. Its new message-queuing feature is intended as a lightweight option for customers that occasionally need to support indirect communications.

Messages are stored in queues and forwarded as network connections and bandwidth become available.

Thanks to the Precise Internet enhancements, Web browsers and Java applications can now access an array of other applications, including legacy applications and those based on Microsoft Corp.'s OLE Custom Controls, Haley said. The OLE support lets client applications interact with mainframe systems as if

the latter were OLE services.

Other enhancements support Internet data encryption and authentication standards, and create an interface to security systems already deployed by customers.

Finally, Version 3.0 supports the recently announced Lightweight Directory Access Protocol, which lets applications interact with a host of LDAP-compliant directory systems.

© Precise: (617) 380-3300.

Uniplex

Continued from page 33

[these] repositories," said Linda Myers-Tierney, industry consultant and director at International Data Corp. in Framingham, Mass.

The drawback to such offerings is that many companies have already built Web servers, and do not currently have their corporate data stored in a document management system.

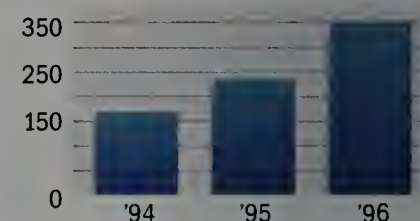
But onGO DMS customers are enthusiastic.

"I can make documents available to users on the factory floor via Web browsers and still have version control," according to Michael Miller, manager of

THE INTERNET FUELS DOCUMENT MANAGEMENT MARKET

Companies are turning to document management systems as a way to secure and control their expanding document collections.

(Based on worldwide sales in millions of dollars)



SOURCE: OELPHI CONSULTING GROUP, BOSTON

information systems at Coors Electronic Package Co. in Chattanooga, Tenn., a beta tester.

The onGO DMS runs on Windows clients and Unix servers; Uniplex is working on Windows NT server support. Prices start at \$650 per onGO DMS user; the Web add-on ships with onGo DMS at no extra charge.

© Uniplex: (800) 356-8063.

BusinessBriefs

Object database maker **Object Design, Inc.** last week announced plans to go public and expects to raise about \$30 million for working capital and repayment of debt. The company markets the **ObjectStore database** and related tools used to build and deploy object applications.

Atria Software, Inc. and **Pure Software, Inc.** have announced plans to merge. The new **PureAtria Corp.** will offer both Atria's line of software configuration management tools and Pure's products for software testing. Pure President Reed Hastings will be the president and chief executive officer of the new company. Atria President Paul Levine will become the chairman of the new board of directors. The merger, to be accounted for as a pooling of interests, is expected to be final by September.

KPMG Peat Marwick LLP has opened its Client Mentoring Center in Radnor, Pa., intended to serve as a laboratory to help customers design **data warehousing** models. The facilities will let developers evaluate performance, calculate cost-effectiveness and experiment with various software and hardware combinations.

The only trick they know is 24 pages per minute. So don't expect any real intelligence.

In this dog-eat-dog world, we've always found going beyond the pack more productive than chasing one's own tail.

So while others rolled around in old 32-bit technology, QMS purred along with an advanced 64-bit, 100 MHz controller powered by NEC's new V_R4300 microprocessor, for superior performance on complex print jobs and graphics.

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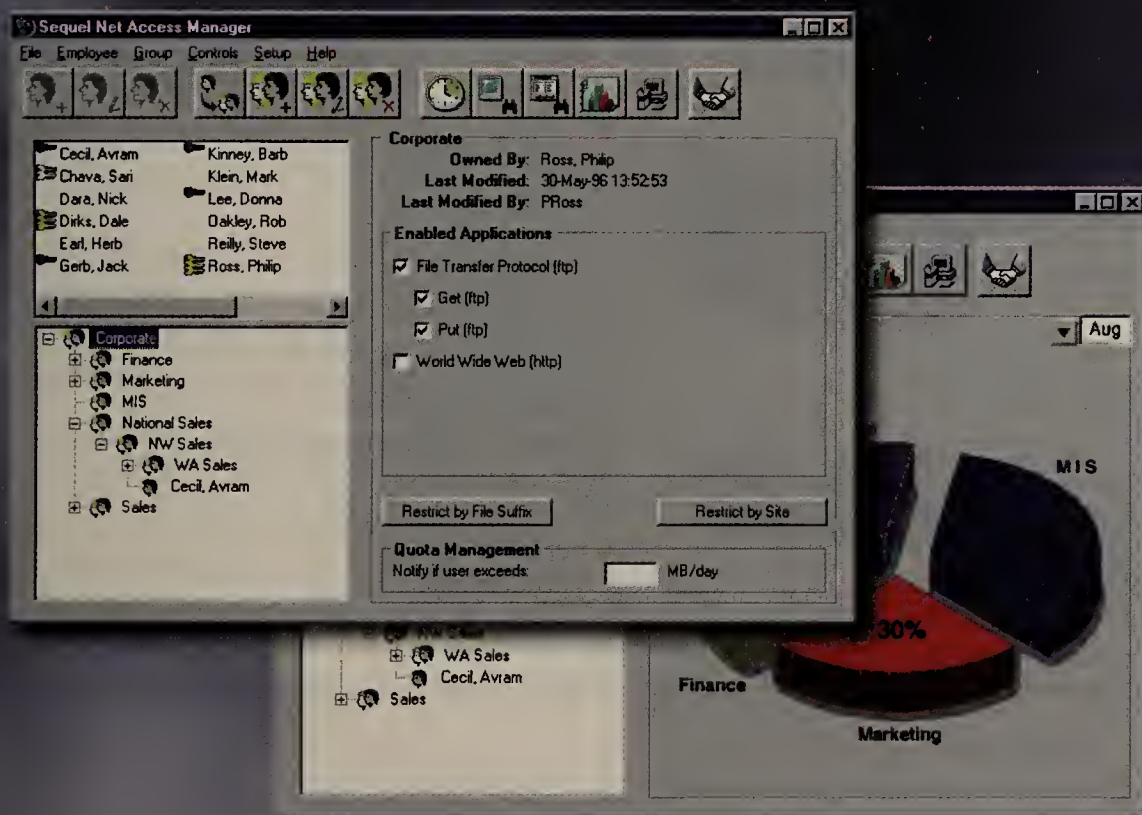
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QMS 2425Ex Print System

Circle Reader Service #51

The Net has enormous potential to let people gather facts, share information, explore new ideas, squander resources, bloat local storage and bring your network to its knees with interminable traffic composed of who-knows-what.



Introducing Sequel Net Access Manager.

While the online revolution may well be the best thing to happen in a long time to people who use information, it could be the worst thing that ever happened to your network – if you don't know

what's going on. But now there's Sequel Net Access Manager, the

Although the core of Sequel Net Access Manager is a powerful IP packet filter, the main user interface is intuitive enough for non-IS managers to establish access privileges and run reports.

most effective tool for managing and reporting your company's Internet, intranet and online usage. It's easy to install, easy to use, and makes it a snap to monitor and report data traffic and service requests by user, by group or across your company. It even lets you set access and download privileges, if you choose. All without degrading performance anywhere on your system. Call **800-881-2465 ext. 4040** or visit us at www.sequeltech.com to learn about our free product evaluation program.

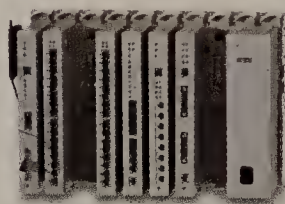
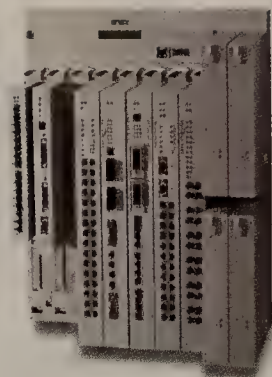
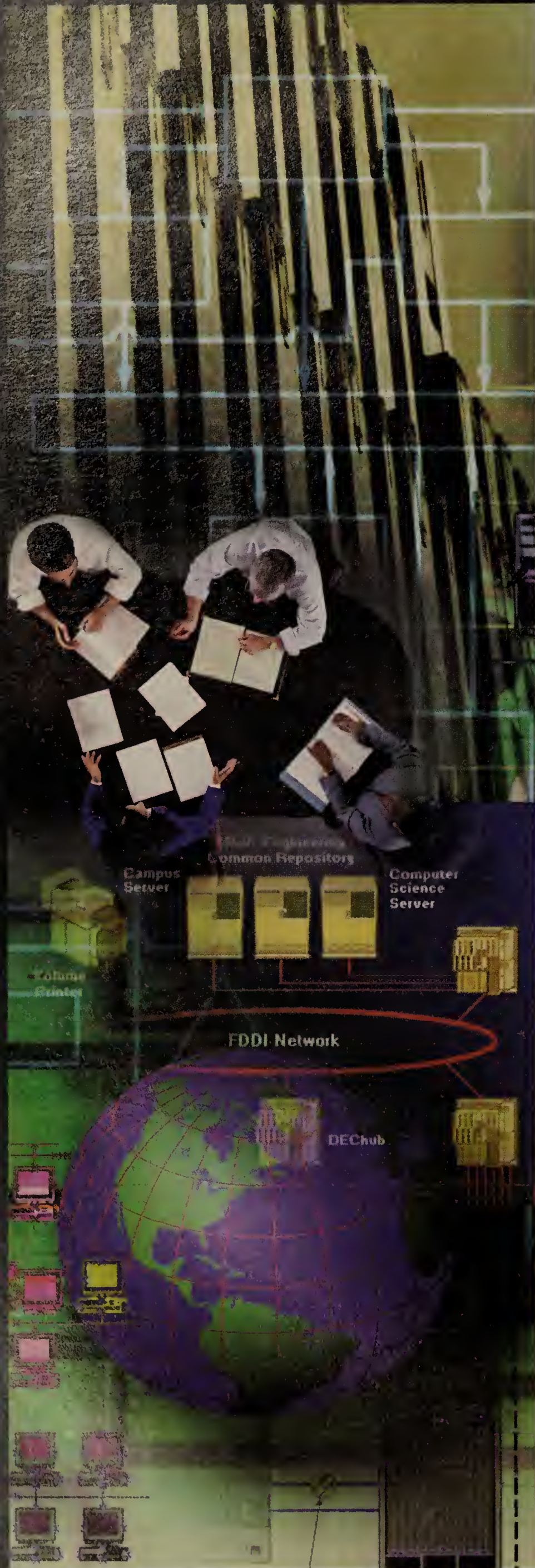
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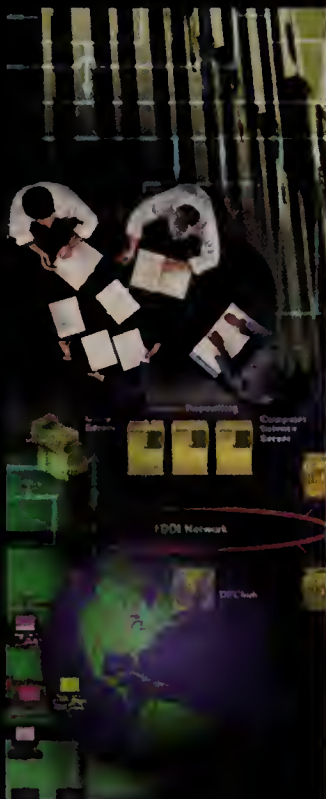
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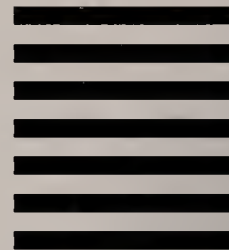
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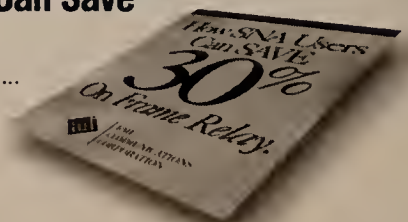


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Circle Reader Service #56

Intranets & the 'Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

■ **Microsoft Corp.** will bundle **Shockwave** — Macromedia, Inc.'s plug-in software for adding multimedia interactivity to Web pages — with its Internet Explorer 3.0 Web browser. It will also put Shockwave into the next version of Windows 95 and the Microsoft Internet starter kit.

Internet Explorer 3.0 and the ActiveX control of Shockwave will be available free this summer from Microsoft's and Macromedia's Web sites, www.microsoft.com and www.macromedia.com, respectively.

Microsoft: (800) 426-9400;
Macromedia: (415) 252-2000.

■ **Come July**, users of **Yahoo!** Inc.'s Internet guide will find that **Digital Equipment Corp.**'s AltaVista service has become its preferred search engine.

The two companies announced earlier this month that they had reached a multi-year agreement.

Yahoo!: (408) 328-3300; Digital: (800) 336-7890.

■ **US WEST, Inc.** earlier this month unveiled a new **Internet Yellow Pages** directory service that customers can use to access business listings for 40 major metropolitan areas in the company's 14-state service area.

Users can search by business name, category, address, zip code or phone number — or a combination of those elements. Business listings for US WEST's 14-state service area will be available later this summer and nationwide listings will follow later in the year, the company said.

■ **WRQ** has announced **Reflection Mobile**, which includes a version of the company's product optimized for **serial communications**.

It includes PPP and SLIP, along with File Transfer Protocol, mail, a browser, a newsreader, LPR printing, ping and finger. The Windows product, available now, sells for \$129.

WRQ: (800) 872-2829 or <http://www.wrq.com>.

Server software refines Web site management

WebMate/Foundation stores Web elements in database.

By John Robinson

A Massachusetts start-up today will announce server-side software that replaces the traditional directory structure of Web sites with a database.

Designed to give users a Web site development and management solution in one box,

Learn more about Web site management on
Network World Fusion.
Select News+ then Intranets
and the 'Net.



WebMate Technologies, Inc.'s WebMate/Foundation makes it easier to manage, update and access Web-site data, the company claimed.

WebMate/Foundation sits under a HyperText Transfer Protocol (HTTP) server.

When a browser requests content, the HTTP server accesses the WebMate database, which includes HTML, images, scripts, content and security settings.

To ease the development of Web pages with recurring content, the software includes common tags for these elements. Once the tag is changed, all the pages with that element

InterCon goes for TCP/IP sweet spot

By Ellen Messmer

Herndon, Va.

InterCon Systems Corp. this week will ship TCP/IP connectivity and browser software for Windows machines and the Macintosh. Bundled as an integrated suite of applications called tcpCONNECT4, it will include a wide range of tools such as File Transfer Protocol, telnet and

a user can navigate instantly from the Web to E-mail to telnet.

For instance, an E-mail message can highlight URLs in incoming messages. This way, a user can click on the highlighted URL to launch the browser straight to the Web or FTP site. "Or, you could cut out a Web window and paste it into a telnet session and send it off," said

The tcpCONNECT4 menu

Product	Price	Description
Enterprise	\$495 per user	Suite includes NFS client/server, bidirectional printing, FTP client/server, Gopher client, Web browser, E-mail, Usenet news, Unix utilities.
Office	\$295 per user	Enterprise applications suite without NFS and bidirectional printing.
Net	\$115 per user	A basic applications suite plus InterCon mail package.
NFS	\$245 per user	File-sharing application suite built on InterCon's NFS/Share.

SOURCE: INTERCON SYSTEMS CORP. HERNDON, VA.

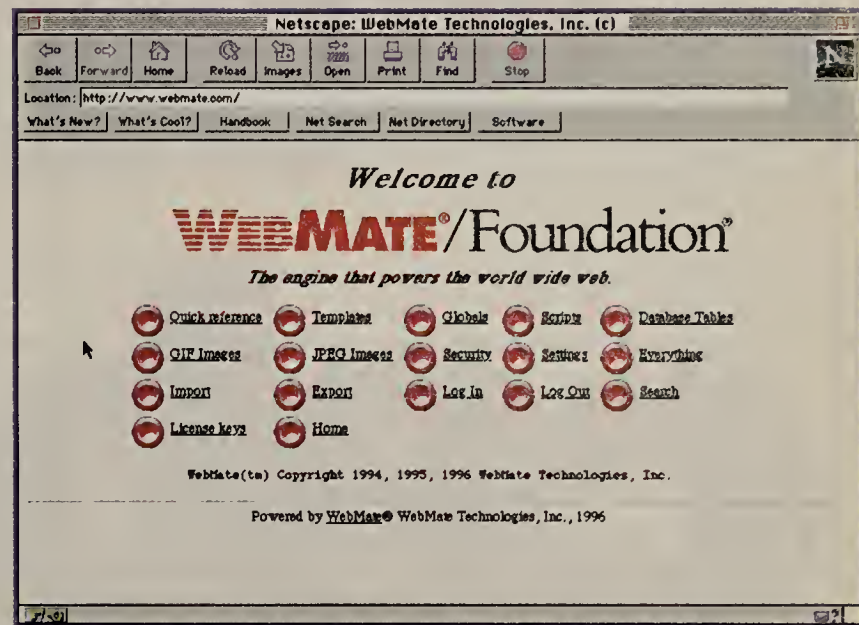
electronic mail. InterCon will license the software per seat in four different editions, at prices starting at \$115 per user (see graphic).

While increasing numbers of application vendors are providing Internet combination packages, InterCon intends to break away from the pack with an application suite that is so integrated,

Dave Hudson, InterCon president and chief executive officer.

InterCon's TCP/IP applications and browser all have a common toolbar for quickly jumping between them. The browser is based on the Netscape Communications Corp. plug-in APIs; support for the Microsoft Corp. Web plug-ins is planned.

©InterCon: (703) 709-5500.



WebMate's server software includes all the necessary functions for Web development.

are changed, and links are maintained.

"If you have 80 Web pages all with the same look and feel, and you decide to change that look and feel, you can imagine how long it would take to alter all of those individual pages," said Anker Berg-Sonne, vice president of engineering. "With WebMate, you only have to alter the tags."

Because all Web content is contained in the database, it can also be moved to a different server or directory, or renamed without affecting any of the links.

Developers can access the database and create applications through either electronic mail

or a browser interface. WebMate/Foundation also includes a scripting language.

In addition, WebMate/Foundation allows administrators to increase levels of security down to individual data records, setting different access rights for each.

Add-on modules, including a SQL interface and electronic payment support, are expected later this year.

WebMate/Foundation is available for a free 60-day trial and can be downloaded from the company's Web site at <http://www.webmate.com>. The software is priced at \$95 until Sept. 3, and \$495 thereafter.

©WebMate: (617) 828-5600.

Ascend adds fuel to firewalls

By Tim Greene

Alameda, Calif.

Ascend Communications, Inc. recently introduced a firewall to secure remote office LANs or even protect single telecommuter sites from predators seeking to attack over the Internet.

The Secure Access Firewall software is the first fruit of Ascend's marriage with Morning Star Technologies, Inc.

Michael Hulhorst, systems architect for Creative Cybernetics, Inc., a consultancy in Columbus, Ohio, beta-tested the software on ISDN lines with some of his customers.

According to him, the product could perform multiple tasks: keep individuals or entire regional offices out of the corporate network and allow access only to the corporate Web site;

keep out telnet or File Transfer Protocol traffic (if that is what the user wants); and filter traffic that is coming in on a particular ISDN port with a different filter, depending on the calling location.

Hulhorst found the filter-builder graphical software easy to use. "Ease of use is important to me. I want to install it and make my client as self-sufficient as possible," he said.

Secure Access is available on Ascend's Pipeline 50, 75 and 130 remote access routers and bridges that support switched digital, leased-line and ISDN options. It is also available on Ascend's MAX 200Plus, 1800, 2000, 4000, 4002 and 4004 central-site remote access routers.

Pricing starts at \$500.

©Ascend: (510) 769-6001.

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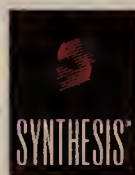
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Circle Reader Service #45

Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World tracks down answers to your questions. Please submit them to Chris Nerney via phone at (800) 622-1108, Ext. 451, the Internet at cnerney@nww.com or fax at (508) 820-1103.

I appreciated the information in your recent LAN switch Buyer's Guide (NW, June 3, page 41), but that article just scratched the surface of my area of interest: token-ring switches.

I am currently evaluating token-ring switches from four vendors, and I find myself with very little information from the various trade journals I read. I'm sure there are many others in the same situation. Please let me know if I've overlooked any information that is available.

Michael Sweeney, via the Internet
Network World will present the results of a token-ring switch test next month. The test examines the latency and throughput of Madge Networks, Inc.'s Smart Ringswitch, Nashoba Networks, Inc.'s Concord Token Ring Switch and 3Com Corp.'s LANplex 6000.

Results of a test of Centillion Networks, Inc.'s Centillion 100, which is now owned by Bay Networks, Inc., were published last year (NW, Sept. 4, 1995, page 43).

The Tolly Group, a member of Network World's Test Alliance, has also tested several token-ring switches and prepared a Token Ring Switching Industry Study. The Tolly Group's World-Wide Web site has test results for IBM's 8272 Nways Token Ring LAN Switch Model 108 and Cisco Systems, Inc.'s Catalyst 1600, plus a document detailing the benefits of Standard Microsystems, Inc.'s Elite-Switch 1 Token Ring Switch, which is now owned by Cabletron Systems, Inc.

The Token Ring Switching Industry Study is also posted on The Tolly Group's Web site. The study examines token-ring switches from 3Com, Cabletron, Cisco, IBM, LanOptics, Inc., Madge Networks and Olicom USA, Inc.

The Tolly Group says the study will assist end users in evaluating, selecting and implementing token-ring switches.

You can download the test results and a complete copy of the study free of charge at <http://www.tolly.com/productevaluations/technology/tokenring/tokenring.html>.

New switches send IP over ATM, cut processing of routed traffic flows

By Larry Lang

Switching is internetworking's newest panacea. Ethernet LAN switches provide dedicated 10M bit/sec to the desktop to support the most sophisticated applications. Fast Ethernet and FDDI switches power enterprise LAN segments with dedicated 100M bit/sec per port.

But as switches provide local relief for increased LAN traffic, they put new strains on enterprise backbones. And as bridged solutions, they flatten network topologies, leaving networks susceptible to broadcast storms.

To address these issues, many networking vendors recommend a combination of Asynchronous Transfer Mode switching and routing.

This alternative raises new concerns. Most conventional collapsed-backbone routers have too much processing overhead to fill the 155M bit/sec full-duplex links of today's ATM switches.

In addition, ATM does not interoperate natively with the Internet Protocol (IP) — a big limitation since most backbones and the Internet use IP. Classical IP over ATM (IETF RFCs 1577 and 1483), and the ATM Forum's LAN Emulation and Multiprotocol over ATM

An IP switch dynamically shifts between store-and-forward routing and cut-through switching, based on the needs of the IP traffic, or flows. A flow is a sequence of IP packets sent from

applications and network management tools.

Beyond optimizing throughput, flow characterization allows an IP switch to make quality-of-service (QoS) decisions accord-

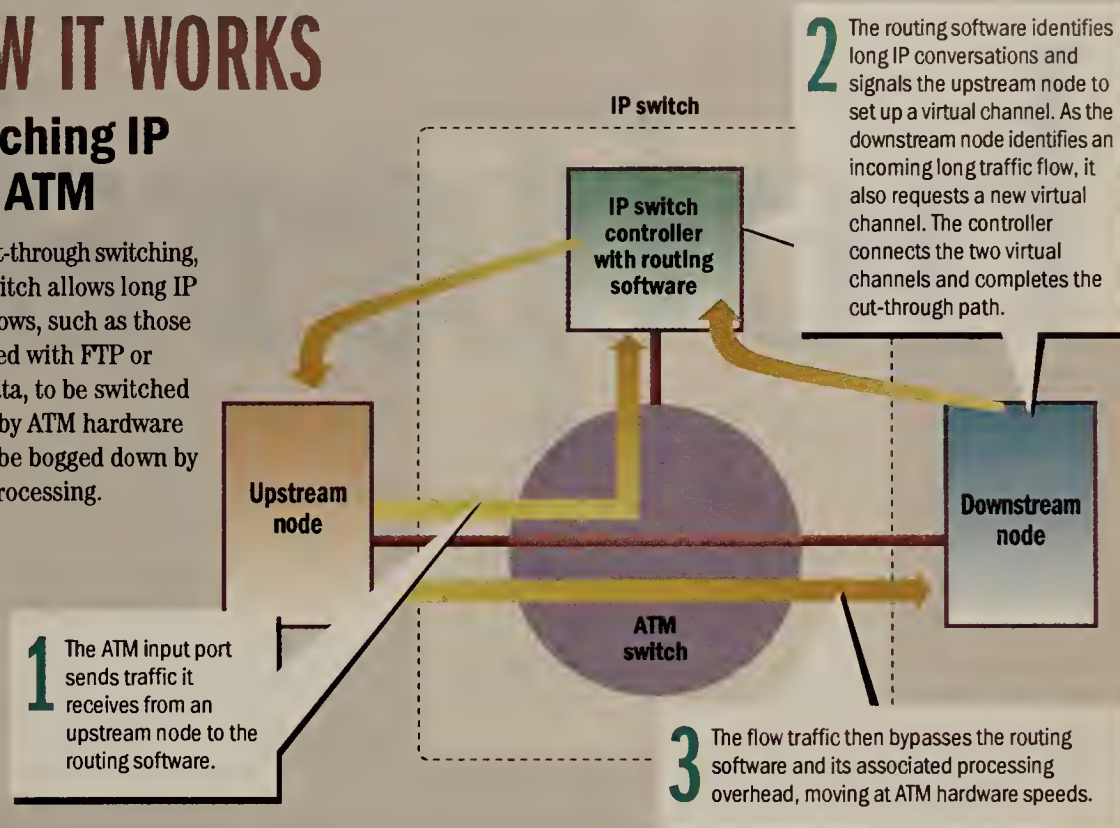
atively trivial; IFMP can be implemented in less than 10,000 lines of code, a small fraction of the overall IP routing protocols. In contrast, a typical ATM switch running MPOA requires about 300,000 lines of code.

IP switching is rapidly gaining mind share across the networking industry for several reasons. It provides a simple solution to a difficult problem. It is based on

HOW IT WORKS

Switching IP over ATM

Using cut-through switching, an IP switch allows long IP traffic flows, such as those associated with FTP or HTTP data, to be switched directly by ATM hardware and not be bogged down by router processing.



STANDARD APPROACH

Check out next week's Technology Update for a progress report on the ATM Forum's efforts with MPOA.

(MPOA) specification attempt to deal with these interoperability issues, but these proposals are quite complex.

IP switching takes a simpler approach. In a single platform, an IP switch implements the IP protocol stack directly onto the ATM hardware interface. This allows the ATM switch hardware to operate as a high-performance, link-layer accelerator for IP routing. IP switches deliver ATM at wire speeds while maintaining compatibility with existing IP networks, applications and network management tools.

a particular source to a destination sharing the same protocol type — such as TCP or User Datagram Protocol — type of service and other characteristics, as determined by information in the packet header.

An IP switch automatically chooses cut-through switching for flows of longer duration, such as File Transfer Protocol (FTP), HyperText Transfer Protocol or telnet data and multimedia audio and video (see graphic). The IP switch reserves hop-by-hop, store-and-forward routing for short-lived traffic, such as Simple Mail Transfer Protocol data and Domain Name Server or Simple Network Management Protocol queries.

The majority of data is switched directly by the ATM hardware, without additional IP router processing, achieving millions of packets-per-second throughput. And since an IP switch bases its routing decisions on IP protocols, it behaves like other IP nodes and is naturally interoperable with existing

ing to local priorities. QoS information can be based on the application, the type of service field in the IP header, the protocol and other information.

Multicast traffic also maps cleanly into the IP switch flow classification mode. The ATM switch engine handles high-performance multicast replication, while short-lived multicast traffic is forwarded to multiple destinations by the IP routing software.

IP switching intelligence derives from two publicly available protocols: the General Switch Management Protocol (GSMP) and the Ipsilon Flow Management Protocol (IFMP). GSMP is responsible for setting up, tearing down and monitoring the status of the virtual channels within the ATM switch fabric.

IFMP associates IP flows with ATM virtual channels and defines the format for flow-redirect messages and acknowledgments.

At approximately 2,000 lines of code, the GSMP software is rel-

robust, proven and well-understood IP technology, so it is inherently compatible with existing network infrastructures.

IP switching offers very high performance at switching prices. And finally, it's based on two publicly available protocols that can be easily implemented on a range of host and switch platforms.

Lang is vice president of product management at Ipsilon, the Palo Alto, Calif., inventor of IP switching. He can be contacted by phone (415) 846-4600 or via the Internet at llang@ipsilon.com.

Need information?

Let Network World provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

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SAVE

Somehow, the smaller the world gets, the more its information grows. Each day, networked computers are making more kinds of information available to more people than ever before. From daily stock market prices to weather maps to comic books, the information we generate is the lifeblood of business. And that makes the decision of how to manage and store it even more vital.

At IBM, we're constantly thinking of new ways to maximize the value

of your information. Part of which means understanding that different kinds of information can have different kinds of storage needs. For some, the reliability of a 24-hour, seven-day-a-week system is absolutely critical. For others, having instantaneous access is key. And with rare exception, cost is always an important consideration.

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you. On June 10, an OEM agreement added a number of their disk storage systems to the growing IBM storage family.

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EDITORIAL INSIGHTS

Victory, for now

It's with growing concern that I've watched countries around the world begin to clamp down on the Internet, imposing more or less stringent controls on what 'Net users can say and read. Sadly, my own country was among those trying, through ill-formed mandates, to get a grip on this powerful medium.

So I was profoundly relieved by a federal court's resounding rejection last week of the controversial Communications Decency Act—a decision that reaffirmed perhaps the most basic principle laid down in the Constitution: freedom of speech.

The decision has ramifications that extend far beyond the constitutionality of the poorly constructed CDA. For one thing, it confirms what many CDA opponents had clearly stated: Laws already exist to protect children from the dangers the overarching CDA sought to prevent. It also begins to dispel the pall of uncertainty hanging over the 'Net.



Far more important, the decision serves as an example for other countries that have imposed, or are considering, limits on Internet speech. I'm not talking about countries like China, which muzzles the 'Net as it has muzzled all other media and cares little

about individual rights, but countries like Germany or France that seem to need reminding about freedom of expression.

What's more, the court, in rejecting the CDA, spoke strongly about the need for personal responsibility—a concept increasingly foreign in our litigious, blame-thy-neighbor society.

"Those responsible for minors undertake the primary obligation to prevent their exposure to such [indecent] material. Instead, in the CDA, Congress chose to place on speakers the obligation of screening the material that would possibly offend some communities," wrote Judge Dolores Sloviter in a point echoed by another member of the three-judge panel.

The power of networking is that it exposes us—sometimes unwillingly—to new ideas and voices. Net technologies that are only now emerging will expand that power exponentially. That's both exhilarating and, as a parent, a bit frightening.

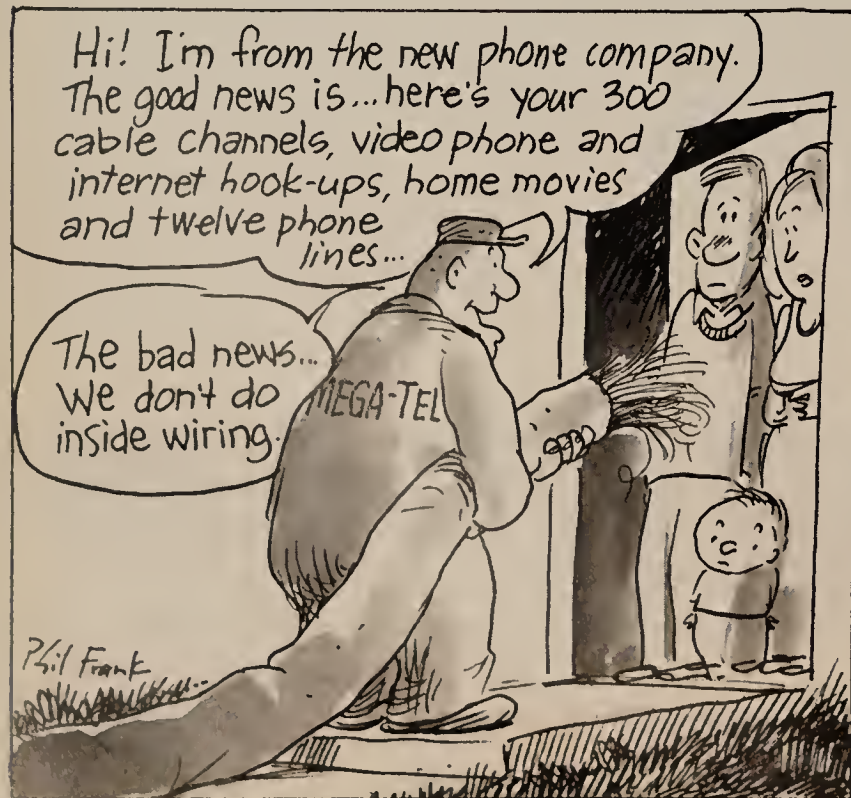
But it's up to each of us to make choices, to reject or accept these ideas for ourselves and our families. If we don't accept that responsibility, if we cede those choices to the government, we pay a very high price indeed for the illusion of safety.

John Gallant, editor in chief

jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com



The Gang of Three may well push networking to a higher level

By Mary Petrosky

Call me an optimist, but I have a good feeling about the Network Interoperability Alliance (NIA) that IBM, Bay Networks, Inc. and 3Com Corp. recently announced.

I know what you're thinking: They're just gang-ing up on Cisco Systems, Inc. I thought that, too.

But then I listened to what the alliance members had to say and realized they're actually trying to help push the industry through a paradigm shift.

That shift is from dumb networks that treat every application the same to intelligent networks that can give an increasingly diverse mix of applications the individualized attention they need.

This shift began with Asynchronous Transfer Mode and has infected the packet-based world. Within standards bodies, such as the IETF and the IEEE, the rush is on to bring ATM's quality of service (QoS) and traffic-handling features to Ethernet and token ring, and to map the services in the packet environment to those in the ATM world.

And it's clear that desktops—via their operating systems and drivers—are as important a component in this paradigm shift as the switches and routers.

This is where the alliance comes in. The NIA says the desktop needs to be empowered to request QoS and related services, and the physical infrastructure needs to translate that request into metrics that span the network, whether it's packet-based, cell-based or a mix of both. Granted, many folks in the industry, including Cisco, would probably say the same thing.

But the alliance, by making the desktop one of three tiers in its architecture, has highlighted a hole in many internetworking vendors' architectures. (The other two tiers in the NIA architecture are the edge network, composed of shared-media hubs and switches in wiring closets; and the core, composed of a switched backbone and centralized services.)

The NIA has combined pieces of each partner's internetworking architecture: 3Com brings its plans to leverage the desktop for remote monitoring; IBM brings its zero-hop routing scheme, which allows desktops to request route information from a server; and Bay brings its vision for a single routing protocol with the Integrated Private Network-to-Network Interface (I-PNNI) protocol.

By pulling together three sizable players, the alliance has a shot at accelerating the process of defining which services the network will support, so companies such as Microsoft Corp., Novell, Inc. and Netscape Communications Corp. can build into their system software the hooks needed to exploit those services.

The alliance members have already started a dialogue with these software makers. As vendors of

adapters, 3Com and IBM also have the ability to implement some of these management and QoS features in drivers that run on their existing adapters, making it possible for customers to preserve their desktop hardware.

The alliance is also shining a bright light on another issue: As the industry moves through this paradigm shift, many new technologies need to be specified and standardized.

Currently, several standards bodies are working, in a relatively disjointed way, on numerous efforts.

The NIA has committed to bringing a common systems orientation to the evolving standards in the hope of preventing gaps in functionality between where one specification leaves off and another picks up. The NIA has also committed to cutting a swath through the myriad specifications and supporting a subset of them, including the IETF's Resource Reservation Protocol and Next Hop Resolution Protocol; the IEEE's emerging 802.1q virtual LAN specification and 802.1p prioritization and group address resolution specification; and the ATM Forum's I-PNNI protocol, which provides a common routing scheme across packet and ATM networks.

In a move away from single-vendor solutions, the NIA members have also committed to testing their products for interoperability, both to ensure that their products work together and to help bring to light any gaps in functionality. If such gaps are identified, the NIA will approach the appropriate standards bodies with joint submissions. Such cooperation could speed the standardization process by reducing the time it takes for vendors to reach a consensus.

The NIA partners have made a commitment, one that stems from the top management of their respective organizations. Now let's hold them to it.

If you're a Bay, 3Com or IBM customer—and even if you're not—tell them what's important to you from a migration and cost perspective as we make this paradigm shift.

Above all, tell them what you want from a network. Then demand accountability. Ask for the results of specific tests, such as interoperability testing among all three companies' ATM switches and edge devices, or among their VLAN schemes.

It's easy to be cynical in this industry and to dismiss such alliances as marketing yahoo-ness. But if these companies believe that collectively they can better move the industry to the next level, then I say go for it.

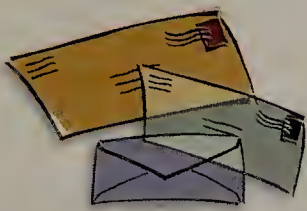
Petrosky is a senior analyst with The Burton Group, which focuses on network computing technology and architectures. She can be reached in her San Mateo, Calif., office at (415) 572-0560 or via the Internet at petrosky@tbgroup.com.



The alliance of IBM, Bay Networks and 3Com has highlighted a hole in many internetworking vendors' architectures by making the desktop one of three tiers in its architecture.



MESSAGE



QUEUE

Fish story

In your article "Islands in the Datastream" (April 22, page 1), Ken Perryman is quoted as saying, "NT Server is easier to configure, maintain and manage than NetWare 4, by all the accounts I've heard."

I think Ken has been getting his networking advice from his fishing buddies. Somebody needs to set this guy straight on server software. Windows makes a great client to work from. But when it comes to managing and servicing a large network with multiple sites, NT Server is a nightmare compared to Novell's NetWare Directory Service.

Poor Ken. He wants to go fishing, but instead he is going to be wading through the swamps of two-way trusts, deleting users from one server and recreating them on another, constantly fiddling with backup domain controllers, and all the while watching the hourglass as the browser scans the network for resources.

Mark Perrelli
Systems administrator
Sunshine Mining and Refining Co.
Kellogg, Idaho

Cabletron comments

Your test of four distributed management platforms (May 20, page 54) presents an unrepresentative picture of Cabletron Systems, Inc.'s Spectrum Enterprise Manager's scalability. This is chiefly because the premise for evaluation focuses on replicating data in order to provide "a tailorable, consolidated, real-time big picture of a broad network topology." This is too limiting a set of criteria for Spectrum.

Spectrum's true client/server architecture provides a more advanced capability for managing in a distributed, or local basis, while data access is achieved via enterprise-aware clients rather than a central data repository. Based on policies, information can be sent selectively to applications residing on different servers depending on organizational and skills availability.

This paradigm has made Spectrum the winner in very large accounts where hundreds, and even thousands, of servers can work together in a single, integrated management system.

Spectrum provides hierarchical big-picture views on any client station in which the entire network is envisioned and problems are flagged on a per-server basis. This man-

agement-at-a-glance prevents the viewer from being flooded with thousands of icons. Customized views of enterprisewide alarms and integrated, tailorable reports are available both on a Unix or Windows NT Spectro-Graph, and on the Web.

Performance issues reflected in the article involved use of beta-level code that was richly functional, but not yet tuned for full performance, and therefore, unreflective of shipping code. For instance, currently shipping NT SpectroServers on a Pentium Pro are equivalent to Unix performance on a Sun Microsystems, Inc. SPARC 20 workstation.

Finally, Spectrum customers need not define model types — Spectrum autodiscovers the network and automatically builds models that provide sufficient information for hierarchical and organizational, as well as topological, views down to connectivity at the port level. Models can be added on the fly using SNMP MIBs, or created without user tailoring through generic models. Only customized models require user intervention.

We appreciate the opportunity to clarify these points.

Patricia Chrystycz
Director, systems and network
management marketing
Cabletron
Durham, N.H.

A user perspective

Regarding your recent test of several distributed management platforms:

As a manager of a group that provides distributed management to a number of customers with network devices numbering in the tens of thousands, distributed management is vital to me. I need a package that can watch many thousands of devices, understand network topology, keep traffic levels down and provide high-value information about the health of individual devices, as well as providing me with a big picture of the entire network.

We migrated last year from SunSoft, Inc.'s SunNet Manager to Cabletron Systems, Inc.'s Spectrum for several reasons. Among them was that Spectrum is the current best of breed in analyzing the status of a large, widely dispersed network.

Hewlett-Packard Co.'s OpenView, SunSoft's SunNet Manager and IBM's Mid-Level Manager are simply element managers.

True, HP and SunSoft have tacked on some accessories that allow alarms to be shuffled from console to console, but with no intelligence and no discretion.

Spectrum allows me to provide high-detail, device-specific information to the person responsible for maintaining a device, while passing only information about topology effects and such to upper management. Think of it this way: With OpenView or SunNet Manager, every phone in a company rings on every desk. With Cabletron, you're getting a customer service department that forwards calls to the appropriate department, while providing management with reliable performance indicator notices about major problems.

Your article also points out that databases

are independent of one another in Spectrum. True to some extent, but I find this to be an enormous feature; no single human being is capable of understanding my network, and I have several people on staff who are dedicated simply to keeping the databases up to date. Distributing these databases by organization allows for better control and security, while still passing alarms selectively.

For a small network of, say, fewer than 100 nodes, I might opt to go with something like OpenView or SunNet Manager; either one can come out of the box and start working in less than an hour. Spectrum requires thought and planning, but will not collapse under its own weight when you see device counts in the four- and five-digit range. I've tried several of the others with large-scale installations, and the results have not been pretty.

On the topic of autodiscovery, I have yet to see an autodiscovery routine on any package that actually saves time over modeling the network by hand.

Without exception, autodiscovery programs are great at finding a bunch of boxes, but do nothing to help you understand their relationship to the rest of the network or what happens when they break. I'll give Cabletron credit for making some headway on this, though their solution is still not up to my standards. The other programs are useless or worse.

Dave O'Shea
Manager, product development
Williams Telecommunications Systems, Inc.
Houston

Feeling low

UB Networks, Inc., as a direct result of being selected for the "Short List" in your low-end hubs Buyer's Guide (April 1, page 69), was invited by The Tolly Group to submit its GeoStax/E and GeoStax/T low-end stackable hubs for evaluation.

We believe the resulting article, "Low-down on low-end hubs" (May 13, page 49) does not provide readers with a valuable evaluation of low-end hubs for several reasons.

First, customers purchasing low-end hubs evaluate products on price per port and the value added by the vendor. Switching and bridging capabilities are irrelevant.

Second, it's unfair to compare UB's GeoStax/E with Intellicom, Inc.'s OfficeStak 5000. UB's GeoStax family targets the low-end stackable hub market by providing basic connectivity at a competitive price. Intellicom's OfficeStak targets a higher market segment by providing advanced features in a three-slot chassis at a higher price.

Third, the article does not provide the reader with a valuable price comparison. The article calculates price per port based on a 50-port stack; the typical stackable configuration is based on multiples of eight, the average workgroup size. For an eight-port stack, the actual price per port as tested would be \$84 for the GeoStax/E and \$145 for GeoStax/T.

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WE KNOW DIGITAL TRANSMISSION INSIDE AND OUT

Finding frame relay Standouts

As services start looking more alike, you'll have to dig deeper to find the one that best suits your needs.

By Liza Henderson and Tom Jenkins

At first glance, competing frame relay offerings may look like mirror images of each other, especially when you focus on just the basic service elements and technical capabilities. Nearly all service providers offer the same port speed and permanent virtual circuit (PVC) bandwidth increments. Ditto for the ability to automatically reroute traffic around failed links and to burst above committed information rates (CIR).

Even pricing structures, which were once as divergent as the views of Republicans and Democrats, are beginning to look alike — in part because of the Federal Communications Commission's order for

carriers to file frame relay tariffs. That order has resulted in more simplified pricing structures, which make it easier to calculate your network cost. However, just because structures are similar, it doesn't necessarily mean rates are (see story, page 56). All these similarities make it more difficult to tell the good apples from the bad. You'll have to do a little extra work to pick apart each service and find the real differences.

When you do, you will discover that carriers are starting to differentiate themselves by using more local access options to extend frame relay's reach to support telecommuters, remote offices and small offices/home offices (SOHO). Some even offer service guarantees to tempt customers away from the competition.

The value-added differences

But nowhere are the differences among carriers more evident than in the value-added services each offers, such as the level of customer premises equipment (CPE) integration and the ability to sup-

port various application-specific packages of transport, equipment and management services — for example, shipping SNA traffic over frame relay.

At a high level, there are two ways carriers add value. One way is to package the CPE used to access the service, such as a data service unit/channel service unit (DSU/CSU), with frame relay transport into something generically called a managed network service.

Many managed frame relay services also include everything from basic network and equipment monitoring and troubleshooting to fully outsourced offerings where the carrier accepts partial or full responsibility for your network and data center. These broader managed services generally have prepackaged service levels, but the carrier may be willing to customize them to meet your needs.

The other way carriers add value is to offer application-specific services, which hide the underlying frame relay transport technology from your applications. These services simplify complex decisions by

Reader views on frame relay services

Based on 100 interviews

Will you stick with frame relay or seek an alternative?
(Based on 70 responses from users with enough experience.)

Stick with frame relay

"There is relatively low downtime. It's pretty reliable."

"It saves money. A T1 line from California to Hawaii would cost approximately \$26,000 per month. With frame relay, it costs between \$6,000 and \$8,000 per month. However, we're waiting for ATM to come along in 1997 or 1998."

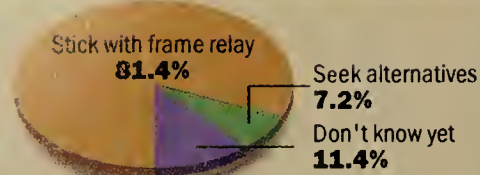
"It accomplishes what it advertises. There is great connectivity at a low cost."

"We like the speed. With traditional SNA links, it took three minutes to transfer a typical size file but with frame relay it takes 40 seconds."

Seek alternatives

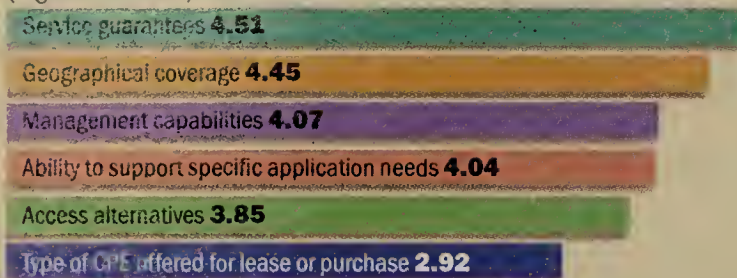
"Frame relay works well but permanent virtual circuits are very limited."

"We're always looking at new alternatives because things are always changing."



How would you rank these service features and options?

(Highest score of 5)



Following deregulation, are you likely to consider using an RBOC over an IXC?

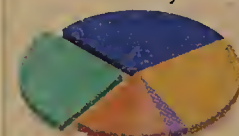
Very likely 10%



"We're always interested in seeing what comparisons there are through increased competition."

"RBOCs know the local loop and they understand it very well. A lot of them have good frame relay infrastructures."

Somewhat likely 27%



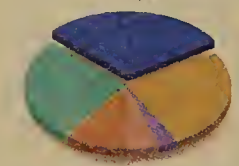
"The Bell Atlantic/NYNEX merger will cover most of the East Coast, which is where we're concentrated."

"It would be nice to have a single provider for local and long distance."

"The quality of service from the RBOCs would have to be good, and we would have to have a deal that would allow us to withdraw without having exorbitant penalties assessed to us."

"If RBOCs can offer better service and lower prices, then I will change."

Somewhat unlikely 29%



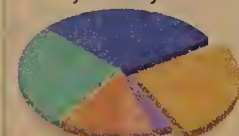
"They aren't able yet to offer services in all geographic areas. I still want to work with one person."

"We're satisfied with the long-distance carriers. We believe the RBOCs will be inferior and more expensive."

"RBOCs are not up to speed with either the competition or the technology."

"Historically, we've had problems with local carrier private lines but no problems with the long-distance carriers. We wouldn't consider the local carriers based on their history."

Very unlikely 26%

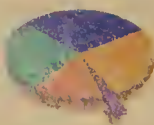


"We're a medical center with critical applications, and we only go with people who have been on the block for a while."

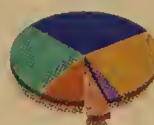
"I don't believe any RBOC could service the different geographical areas we require."

"I really dislike RBOCs. Most of my problems have been with them, not with AT&T. They're unresponsive, they're slow, they're not very technical and I don't think they could manage it."

"Our past experience with RBOCs has shown they couldn't offer the level of service."

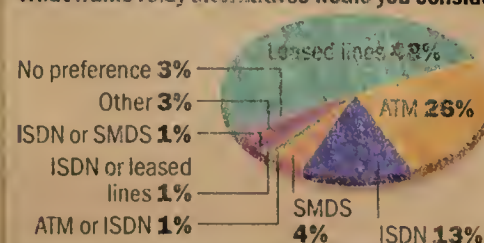


Don't know 3%

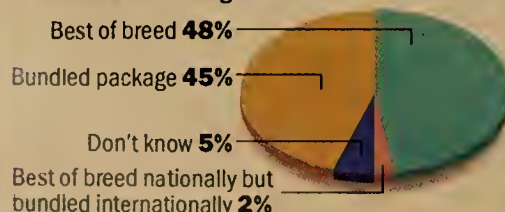


Other 5%

What frame relay alternatives would you consider?



Would you buy transport, equipment and management as a bundled package or look for best-of-breed offerings?



The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning the enterprise network environments and needs of end users. To purchase full survey results, send E-mail to mdabbon@focusdata.ultranet.com, or call Mona Dabbon at (508) 626-2556.

predefining network and equipment configuration options.

All the carriers surveyed for this Buyer's Guide offer LAN interconnection as an application-specific service. To do this, the carriers bundle CPE, such as DSUs/CSUs, bridges/routers and Frame Relay Assemblers/Disassemblers (FRAD), with frame relay transport to shuttle data between remote LANs. Ameritech Corp.'s list of CPE options also includes LAN switches.

Depending on the carrier, you can purchase, lease or rent the CPE. As an example, CompuServe, Inc. can provide a router with two Ethernet LAN ports and one WAN port on a three-year lease for \$250 per month. Members of the Uni-Span Frame Relay Consortium, a group of regional carriers, charge \$95.59 per month for a router with the same configuration and \$46.99 per month for FRADs.

High-Speed Interconnect (HSI) service from MFS DataNet, a division of MFS Communications Company, Inc., is unique in that the carrier delivers to the customer premise a native LAN interface for 10M bit/sec Ethernet, 4M and 16M bit/sec token ring or 100M bit/sec FDDI. The interface provides transparent LAN connectivity that includes local or long-distance frame relay and Asynchronous Transfer Mode services at native LAN speed, or any fraction thereof.

To make this possible, MFS installs a LAN cable in many buildings in the large metropolitan areas it serves. Customers are allowed to tap into that MFS cable at native LAN speed, effectively becoming a segment off the MFS LAN.

MFS links its LAN into an ATM edge switch, which aggregates 10M bit/sec

Ethernet, 4M or 16M bit/sec token-ring, or 100M bit/sec FDDI LAN frame relay traffic to an ATM backbone network switch. All of this is done transparently to the users, who think they have signed up for frame relay service.

Permitting SNA to ride over frame relay is a fast-growing application-specific service. IBM's decision to support frame relay interfaces on its devices, coupled with the availability of FRADs and routers that support Synchronous Data Link Control and Logical Link Control 2 protocols, has increased the rate of migration of private lines in SNA to frame relay.

The services that send SNA over frame relay are very similar to the ones that support LAN interconnection. The carrier can either package the CPE — typically a FRAD or router that supports SNA — with frame relay transport. Alternatively, the carrier can offer a native SDLC service, which makes sending SNA traffic over frame relay truly invisible to end users. In such a service, your current equipment configuration is kept intact and no additional hardware or software is needed. The reason is that you connect an SNA link to hardware in the carrier network, which converts SNA traffic to frame relay and back again.

Most carriers offer SNA over frame relay services today. MCI Communications Corp. plans to provide native mode SDLC in the third quarter. MCI only recently started offering SNA services; it's too early to tell how well it will implement this SDLC conversion offering.

Carriers are starting to target voice over frame relay as an application-specific service. This will enable customers with predominantly data applications to also

How to sort out the services

When evaluating frame relay services, don't be misled into thinking you need to be an expert in designing WANs. Look at the carrier's prepackaged applications- or solutions-based frame relay services. Also consider some of the managed network services. You'll find there are service packages designed to suit almost every application that can run over frame relay.

If you have a nonstandard application, ask the carrier to customize a solution for you. More often than not, carriers will jump at the chance to help. If you're short on, or don't have, in-house networking resources, these managed network services or applications-based services are viable options.

You may also want to start thinking about implementing frame relay for your branch locations, telecommuters and mobile personnel. Integrating different types of users onto one frame relay network can save you money over the long run. It eliminates some of the headaches associated with managing multiple networks. It also gives you a good migration path when these smaller locations start needing more bandwidth.

With carrier competition heating up, watch for attractive promotions and service guarantees. Keep in mind, however, that most guarantees don't make up for the hassle you go through when your network is down or not installed on time. But all else being equal, guarantees could be the deciding factor.

Last, but not least, make sure you price your entire network configuration using the carriers' published or tariffed prices. Subtle differences on the carriers' individual port and permanent virtual circuit prices as well as term and volume discount schedules can make a big difference to the bottom line.

— Liza Henderson and Tom Jenkins

FRAME RELAY SHOPPER'S CHECKLIST

✓ Check out packaged applications and managed services. Ask about custom options.

✓ Try to include branch offices, telecommuters and mobile workers in your frame relay plan.

✓ Keep an eye on promotions and guarantees.

✓ Price out your entire configuration.

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According to International Data Corporation (IDC), Intranets are growing faster than the Internet itself. The number of Intranet Web servers now comprise 55% of total internet servers and are expected to nearly triple in size this year to more than 200,000 and to exceed 4.5 million by the year 2000.

While Intranet Web servers today act mainly as document publishing systems, a number of vendors are now rapidly extending their functionality. For example, Web servers are being integrated with databases, linked to mainframes and other legacy systems, and providing workflow services. Combined with the high bandwidth capacity of corporate data networks, your organization can capitalize on advanced features such as real-time audio and video as well as collaborative applications and 3-D data representation.

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4. Explore information publishing on your Intranet at the corporate, group and individual levels
5. Analyze the positioning of market leaders such as Microsoft, Netscape, Novell and Sun and how their plans will impact your Intranet solutions
6. Explore the future of Intranet technology with Sun's Java and the rendition of data in three dimensions with VRML
7. Learn the direction of Intranet-based groupware
8. Strategically plan your Intranet and quantify your Return-on-Investment
9. Learn how to select the best Web server products for your Intranet
10. Explore the theory and operation of Web servers

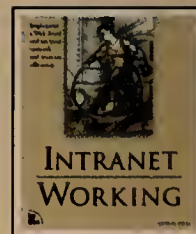
1996 LOCATIONS AND DATES

ATLANTA, GA	MAY 30	MORRISTOWN, NJ	JUNE 27
WASHINGTON, DC	MAY 31	CHICAGO, IL	JUNE 28
NEW YORK, NY	JUNE 3	PHILADELPHIA, PA	JULY 23
BOSTON, MA	JUNE 4	DALLAS, TX	JULY 25
IRVINE, CA	JUNE 11	DENVER, CO	AUGUST 5
SEATTLE, WA	JUNE 18	MINNEAPOLIS, MN	AUGUST 7
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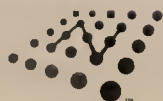
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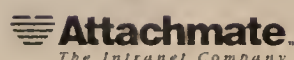
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Preparing for the Next Generation Internet Protocol

The next generation of Internet Protocol — IPv6 will significantly impact your TCP/IP-based inter-network. The Internet explosion now requires new functions that go beyond the capabilities of the current Internet Protocol, or IP. These include enhanced security, support for real time traffic flows and expanded addressing capabilities. The addressing issue has been one of the most significant concerns as it was predicted that the Internet community would run out of available addresses, thus limiting the growth of this critical communication resource.

In late 1990, the Internet Engineering Task Force (IETF) initiated efforts to select a successor to the IP. In late 1993, the IETF formed the Internet Protocol — Next Generation (IPng) working group, which was chartered with investigating the various proposals, and recommending a course of action. The outcome of those efforts produced what is now known as IP version 6 (IPv6), which is currently being implemented by many vendors.

Perhaps more importantly, IP is the foundation of the TCP/IP protocol suite. Therefore if IP is revised, other protocols must be changed as well. The significance of this protocol revision extends to LANs, MAN and WAN transmission systems, as well as the upper layer protocols and application programming interfaces.

Whether you are a network manager, designer or software developer, this seminar will provide you with information on the widespread ramifications of this new protocol. You will learn how to effectively plan and implement a successful, orderly transition.

IP v6

THE NEXT GENERATION FOR TCP/IP NETWORKS

TOPICS YOU DON'T WANT TO MISS!

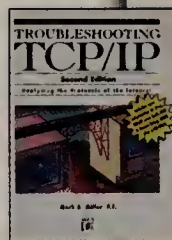
- ✓ **Learn how the implementation of IPv6 will allow continued expansion of the global Internet**
- ✓ **Discover key features of IPv6, including larger addresses and security**
- ✓ **Learn how to strategically plan your transition from IPv4 to IPv6**

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- Understand the limitations of the current Internet Protocol — IPv4
- Learn details of the proposed IPng solutions: CATNIP, TUBA and SIPP
- Understand the key functional and protocol enhancements incorporated into IPv6
- Analyze the formats of the IPv6 packet header, extension headers, ICMPv6 messages, Neighbor Discovery messages and others
- Gain detailed insights into how the IPv6 transition will affect other protocols, such as Ethernet, token ring, RIP and OSPF
- Explore the effects of IPv6 on other elements of your internet or intranet architecture
- Learn how leading vendors such as Bay Networks, Cisco Systems, Digital, FTP Software, Sun and others are implementing IPv6
- Discover how to obtain public domain sources of further information on IPv6

1996 LOCATIONS AND DATES

Chicago, IL	September 26	Boston, MA	November 8
Washington, DC	October 10	Irvine, CA	December 3
Denver, CO	October 16	San Francisco, CA	December 4
Atlanta, GA	October 24	New York, NY	December 10
Dallas, TX	October 25	Philadelphia, PA	December 11



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send some intracompany voice traffic over frame relay links.

Voice can be carried virtually free of charge because some FRADs are now able to interleave it with data on underutilized frame relay links. Essentially, the FRAD

When to use which access option

► An **ISDN BRI** line is well suited for high-volume telecommuters: branch, small or home offices; and for Internet access because of the 128K bit/sec bandwidth it provides.

► **Switched 56K/64K bit/sec** local loops can be used to back up dedicated access links in case of failure.

► **Analog** modem or **cellular** access is largely beneficial to mobile workers who won't always be able to tap into an ISDN BRI line.

► Using **frame relay NNI** is an inexpensive way to interconnect locations within a LATA to a long-distance frame relay service.

greater revenue potential with voice over frame relay, they might begin to interconnect their frame relay networks with their public-switched nets and make it possible for voice calls originating on a frame relay link to terminate on a dial-up line.

Then there is the issue of maintaining voice quality in a service designed to handle bursty traffic. Extended delays in frame delivery can make a person's voice sound choppy and unnatural.

Finally, there are no standards in place today for sending voice over frame relay. Therefore, all decisions on how to deploy this technology are in the hands of the CPE vendors and carriers. Today, Ameritech, Southwestern Bell Corp., Sprint Corp., UniSpan, BellSouth Corp., Infonet Services Corp., MCI and NYNEX offer turnkey voice over frame relay service packages.

Local-loop options abound

Another big difference you'll find among services is the type of local access offered. Before 1995, you could only use dedicated local loops to access an interexchange carrier's (IXC) frame relay network, typically at 56K bit/sec and above.

Nowadays, you can get on the frame relay network via a 2,400 bit/sec analog dial-up link. This is possible, thanks to carrier deployment of remote access servers from companies such as Ascend Commu-

nications, Inc., Teleos Communications, Inc., U.S. Robotics, Cisco Systems, Inc. and 3Com Corp. These servers can take data from incoming analog, ISDN Basic Rate Interface, switched 56K/64K bit/sec or even cellular ports, and send it to a carrier switch over an outgoing frame relay port.

These access options make it possible to use frame relay in telecommuting, remote branch office, SOHO, mobile and Internet access applications (see graphic, this page). But you need to look carefully because access options can vary widely among carriers.

ISDN, particularly BRI, is generally available nationwide. BRI provides up to 128K bit/sec of usable bandwidth on a dial-up basis. The price charged for a local carrier BRI connection to an IXC's frame relay service has dropped over the past two years and is now only about \$30 to \$90 per month.

The IXCs then add another access charge on top of that. MCI charges \$180 per month, plus a usage rate of about 15 cents per minute; Sprint charges \$290 per month plus 50 cents per kiloframe transmitted; and CompuServe assesses a \$150 fixed monthly charge regardless of usage.

In addition to BRI, CompuServe, Infonet, MCI, Sprint and UniSpan support ISDN Primary Rate Interface access options.

About half the carriers listed in the Buyer's Guide chart now support analog dial-up access. CompuServe charges \$150 per month sans usage charges, whereas AT&T considers its analog access and ISDN options enhanced services and prices them on an individual case basis.

AT&T, MCI and Sprint also offer switched 56K/64K bit/sec local access to their frame relay nets.

There is another access option emerging, one that utilizes the Network-to-Network Interface (NNI) for interconnecting different carrier frame relay nets. With this option, you can use a local carrier frame relay service to interconnect a dense pocket of locations within one local access and transport area, and use that same service to access an IXC frame relay net.

Depending on your network design and the local exchange carriers and IXCs involved, you could reduce access costs as much as 30% by tapping a LEC service that uses NNI for IXC access.

Perhaps the most important shortcoming of NNI is that services are limited to the features that are common to both carriers.

For example, if the long-haul carrier offers PVCs in 4K bit/sec increments and the LEC only offers 16K bit/sec increments, the smallest PVC you can have

crossing the NNI is 16K bit/sec.

The carrier with the most extensive NNI deployment is UniSpan, which uses it to cover 80% of all LEC frame relay service areas. UniSpan's commitment to NNI is not surprising, given that it depends on NNI to connect the various networks of its carrier members.

MCI plans to offer frame relay local access using NNI this month. With NNI, MCI will join AT&T as one of the few carriers with a full-service portfolio of frame relay access alternatives. MCI's HyperStream Remote Access portfolio currently supports ISDN, switched 56K/64K bit/sec, analog and even cellular access. However, MCI does not have much experience in this area yet, which gives the nod to AT&T.

Guaranteed, or you get...

With technical capabilities being all but equal, service guarantees are becoming more integral to some carriers' frame relay services and even tariffs. Some of the typical guarantees you'll find cover installation intervals, availability, data delivery rates, mean time to repair and service satisfaction.

The rewards you get if the carrier does not live up to its promise may consist of installation charge waivers, partial or full

transmits packetized voice but will zip data frames over a PVC when there is silence or pauses in the voice conversation.

Even though there is much interest in voice over frame relay, there are three major reasons why the service has not yet taken off.

First, it is currently limited to intracompany voice traffic because it must terminate at predefined nodes on the frame relay network. If carriers begin to see

The pricing difference

To illustrate the variance in the bottom-line pricing for frame relay services, we used rates from six long-haul carriers to price out a sample five-site configuration.

Each of four remote sites in the configuration has a 64K bit/sec port connection to the frame relay network, whereas a headquarters site has a 256K bit/sec port connection. Four 64K bit/sec full-duplex permanent virtual circuits (PVC) link remote sites to headquarters while eight 32K bit/sec full-duplex PVCs enable the remote sites to communicate.

By looking at the chart, you can see pricing ranges from a low of \$1,610 to a high of \$3,410. The quoted prices cover the standard monthly recurring charges minus any term or volume discounts applied.

Keep in mind that the most cost-effective carrier solution for this network may not be the cheapest for every configuration.

Carriers such as AT&T charge far more on a per-port basis than they do on a per-PVC basis. In AT&T's case, the carrier charged \$830 for a 256K bit/sec port and \$101 for a full-duplex 64K bit/sec PVC. High-port, low-PVC pricing is most cost-effective for meshed configurations or networks that need a high degree of connectivity.

Other carriers, such as LCI International, Inc., may charge less per port than a carrier such as AT&T, but have higher PVC prices.

LCI charges \$320 for a 256K bit/sec port and \$272 for a full-duplex 64K bit/sec PVC. This type of pricing is best suited for star or partial mesh networks.

—Liza Henderson and Tom Jenkins

THE MONTHLY BILL

Monthly charges for a typical five-node network

AT&T	\$2,570
CompuServe (1)	\$2,502
LCI International	\$2,572
LDDS WorldCom	\$1,831
MCI (minimum) (2)	\$1,610
MCI (maximum) (2)	\$2,346
Sprint (Burst Express) (3)	\$2,166
Sprint (Burst Express Plus) (4)	\$3,410
UniSpan	\$1,983

- (1) Includes a DSU/CSU at each customer location.
- (2) Usage-based PVC prices.
- (3) Zero CIR service.
- (4) CIR-based service. Requires a 128K bit/sec port at each remote site instead of a 64K bit/sec port.

Prices are for interconnecting four remote and one headquarters sites. Each remote site has a 64K bit/sec port connection, while headquarters has a 256K bit/sec connection. Each remote site also has a 64K and two 32K bit/sec full-duplex PVCs.

UNISPAN IN A NUTSHELL

The following companies make up the international UniSpan Frame Relay Consortium: EMI Communications Corp., Intermedia Communications, Inc., Norlight Telecommunications, Inc., PacNet, Inc., TeleMedia International, Inc. and Sprint Canada BSG. Over the past two years, this group has interconnected its network to over 80% of all available local frame relay providers using the NNI standard. Future plans include switched virtual circuits and a client-based customer network management system.

monthly recurring charge waivers, higher discounts, or an exemption from contract termination or cancellation penalties.

Here are a few examples of what you can expect from carriers that do not meet their guarantees:

■ Interprise Networking Services from USWEST, Inc. offers a service credit interruption guarantee that reimburses you 1/30th of the monthly recurring frame relay charges for every service interruption that lasts at least one hour.

■ LDDS WorldCom will pay to switch you back to your previous frame relay carrier if you're not satisfied with its service within the first 120 days.

■ Sprint has tariffed a guaranteed data delivery rate of 99% for its Burst Express or zero-CIR services. Sprint guarantees that 99% of the frames you transmit will be delivered to their destinations. The carrier will increase your CIR from zero to 19.2K bit/sec for no additional charge if it fails to deliver 99% of your frames.

■ Ameritech guarantees it will take no more than 15 calendar days to install a new port, five days to add or change a PVC and 10 days to change a port's speed. Ameritech credits 20% of the installation charges if its intervals are not met.

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Frame relay services

Company	Ports			PVCs			Management options				CPE options	LATAs	Switching platform	Dial-up options	Other features					
	Speed (bit/sec)	Install time for new port (calendar days)	Install time to change a port's speed (calendar days)	Simplex CIR assignments on PVCs	CIR (bit/sec)	Install time to add/change a PVC	Online reports	Hard-copy reports	Raw SNMP statistics	Online order entry and tracking					High-speed frame relay (1)	SNA over frame relay	Voice over frame relay	Frame relay access (NNI)	Disaster recovery	X.25 to frame relay interworking
Ameritech Corp. (800) 832-6328	56K/64K, 128K, 256K, 384K, T-1	20	12		0-768K	5 days	✓	✓	✓		DSU/CSU, FRADs, LAN switches, routers	35	Lucent BNS 2000, Cascade 9000	Analog, ISDN BRI		✓	✓	✓		
AT&T (800) 248-3602	56K/64K, 128K, 192K, 256K, 320K, 384K, 448K, 512K, 576K, 640K, 704K, 768K, 1.024M, 1.544M	30	5	✓	4K-1.024M	5 days	✓	✓	✓		DSU/CSU, FRADs, routers	192	StrataCom	Analog, ISDN BRI, Switched 56K		✓			✓	✓ (2)
Bell Atlantic Corp. (800) 846-1200, Ext. 2000	56K/64K, T-1	6	1	✓	8K-768K	1 day	(2)	(3)	(3)	(2)	DSU/CSU, FRADs, routers	19	Cascade 9000 w/lt Cascade 500	ISDN BRI (3)	✓	✓		✓	✓	✓
BellSouth Business Systems (4)	56K/64K, 128K, 192K, 256K, 384K, 512K, 768K, T-1	10	2		1K-T-1	2 days						38	Cascade 9000		✓	✓	✓	✓		
Cable & Wireless, Inc. (800) 292-7658	56K, 128K, 256K, 384K, 512K, 768K, 1.024M, T-1	50	21	✓	19.2K-1.024M	21 days		✓	✓		DSU/CSU, routers	192	Nortel	Analog, ISDN BRI (2)		✓		(3)	✓	✓
CompuServe, Inc. Network Services (614) 723-1356	56K/64K, 128K, 256K, 384K, 512K, 640K, 768K, 896K, 1.024M, T-1	30	3-5	✓	4K-512K	1 day		✓	✓		DSU/CSU, encryptors, FRADs, routers	192	StrataCom IGX and BPX	Analog, ISDN BRI, Switched 56K		✓			✓	✓
Infonet Services Corp. (310) 335-2871	9.6K, 19.2K, 56K/64K, 128K, 256K, 384K, 512K, 640K, 768K, 1.024M, T-1	30	7	✓	0-1.024M	1-5 days	✓	✓	✓	✓	DSU/CSU, routers	11	Northern Telecom Passport	Analog, ISDN BRI		✓	✓	✓	✓	✓
Interprise Networking Services from US WEST, Inc. (800) 225-5879	56K/64K, 1.544M, fractional speeds where available	14-22	14-22	✓	0-1.024M	4 hours (5)	✓	✓	✓		DSU/CSU, FRADs, routers	192	Cascade 8000 and 9000	Analog, ISDN BRI (3)		✓		✓		
LCI International, Inc. (800) 860-0088	Every 56K/64K increment up to T-1	35	21	✓	0-1.024M (6)	2 hours (7)	✓	✓			DSU/CSU, FRADs, routers	192	Newbridge 3645			✓		✓	✓	
LDDS WorldCom (800) 364-5113	56K/64K, 128K, 256K, 384K, 512K, 768K, 1.024M, 6M, 10M, 19.8M	30	30	✓	16K-1.024M (8)	3 days		✓	✓		DSU/CSU, FRADs, LAN and WAN switches, routers	192	StrataCom IPX, Cascade 9000	Analog	✓	✓		✓	✓	✓
MCI Communications Corp. (800) 933-9029	56K/64K, 128K, 256K, 384K, 512K, 768K, 1.024M, T-1	22	5	✓	0-T-1	3-5 days	✓	✓	✓		DSU/CSU, FRADs, routers	192	Bay Networks (Domestic), StrataCom (International)	ISDN BRI, Switched 56K/64K	✓	✓	✓	✓	✓	✓
MFS Telecom Company, Inc. (800) 637-4872	56K/64K, 128K, 256K, 384K, 512K, 768K, 1.024M, T-1, 1.9M, 3M, 4.5M, 6M	30-45	3-5		0-6M	3-5 days	✓		✓		DSU/CSU	66	Cascade 9000 B-SDTX		✓			✓	✓	
NYNEX Corp. (800) 227-5638, Ext. 622	56K/64K, 384K, T-1	15 (9)	15 (9)	(3)	ICB	2-3 days (9)		✓	(3)	✓		192	Newbridge 36120	ISDN (2)	(3)	✓	✓	✓		(10)
Pacific Bell (888) 327-8725	56K/64K, 128K, 384K, T-1	12	1		0-T-1	1 day		✓	✓		DSU/CSU, FRADs, routers	10	Cascade 9000, Newbridge 36120	Analog, ISDN BRI (3)	(3)	✓		✓	✓	
Southern New England Telecommunications Co. (800) 895-7400	56K/64K, 128K, 256K, 384K, T-1	21-35	14		(11)	2 weeks	(3)				DSU/CSU, FRADs, routers	1 (12)	Cascade 9000 B-STDX	Analog, ISDN BRI (3)				✓	✓	
Southwestern Bell Telephone Co. (800) 859-7928	56K/64K, 128K, 256K, 384K, 512K, 768K, T-1	ICB	ICB		0-1.024M	ICB	(3)	(3)	(3)		ICB	28	Newbridge 36120			✓	✓	✓		
Sprint Corp. (800) 910-2418	56K/64K, 128K, 192K, 256K, 320K, 384K, 448K, 512K, 576K, 640K, 704K, 768K, 896K, 1.024M, 1.28M, T-1	30	30		0-1.024M	1-10	(3)	✓	✓		DSU/CSU, FRADs, routers	192	Alcatel TPX1100	ISDN BRI, Switched 56K	(3)	✓	✓	✓	✓	✓
UniSpan Frame Relay Consortium (800) 333-6622	56K/64K, 128K, 256K, 384K, 512K, 768K, 1.024M, T-1, 3M, 6M, 10M, 45M (13)	22	1-3	✓	(14)	1-3 days	✓	✓			DSU/CSU, FRADs, routers	192	Cascade 9000 B-STDX, Newbridge 36120, StrataCom IPX	Analog, ISDN BRI	✓	✓	✓	✓	✓	✓

Product names highlighted in color were selected for the Short List.

Chart compiled by Kathy Scott

Footnotes:

- (1) Above T-1 port speed and T-1 PVC CIR speed.
- (2) Available in 1997.
- (3) Available later this year.
- (4) Vendor would not provide sales phone number.
- (5) On existing port.
- (6) In 8K increments.
- (7) For changes.
- (8) 64K bit/sec increments from 128K-1.024M bit/sec.
- (9) Business days.
- (10) Available 4Q 96-1Q 97.

- (11) Available in 4K bit/sec increments up to 75% of port speed.
- (12) Includes all locations in Connecticut.
- (13) 3M, 6M, 10M, 45M bit/sec available in limited areas.
- (14) Available in 1K bit/sec increments from 0.

ICB = Individual case basis

Not all carriers offer reimbursements for missing installation intervals, but all carriers do publish their installation objectives. Installation intervals have continued to shorten over the last two years. Bell Atlantic Corp. can turn up a brand-new port within six calendar days, and Pacific Bell can change a port's speed within a day, provided it can use existing local-loop facilities. LCI International, Inc. can change a PVC's CIR within two hours with its online frame relay customer network management system, called Authority.

Speaking of management, most carriers offer online customer network man-

agement systems (CNMS) that provide you with frame relay performance, utilization and Simple Network Management Protocol statistics, in addition to monthly hard-copy performance reports.

Today, most CNMSs provide read-only or retrieve-only access to management data stored in a carrier's computer. However, carriers are working on CNMS enhancements that will give you read/write access to their order-entry, provisioning and trouble-ticket systems.

Sprint already enables you to enter and track a new order, as well as enter and track trouble tickets. Most other carriers plan to offer these capabilities late this

year or next.

The future's so bright

What does the future hold for frame relay? Expect to see more solutions packages or applications-based services. The fact that frame relay is the underlying technology may have little to do with the marketing and selling of future services. However, it may take some time before carriers can offer this type of service effectively because it requires solution and application experts, not just frame relay experts.

There's a lot of room for carriers to make their services stand out in the area



Check out Network World Fusion for a listing of the many different guarantees and reimbursements offered by frame relay providers.

Select NetRef, Buyer's Guides then Frame Relay Services.

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Because it transmits SNA and legacy protocols, the CX900 allows users to migrate expensive dedicated networks to Frame Relay without any change to their system configuration. The highly adaptable CX900 also transmits LAN, toll-quality voice and fax traffic over existing Frame Relay circuits and provides V.34 dial back-up and full ISDN support. A single CX900 can support speeds from 56k to T1/E1 for your most demanding throughput requirements. Its 6-slot modular architecture allows for easy and inexpensive system growth at both remote and central sites. And its any-to-any conversion capability makes it the ideal solution for migrating to new technology.

The speed and reliability of digital transmission. Savings of up to 50% over dedicated networks. The ability to consolidate multiple transmission services in a single unit. Smooth transition to new technology. Call MEMOTEC and find out why the Thunderbolt CX900 is the most adaptable and cost-effective Frame Relay solution on the market today!



MEMOTEC
Adaptive Solutions For Evolving Networks

of CNMSs. Most of the CNMSs available today have read-only access.

Even those carriers that do let customers manipulate their network configurations can afford to give customers additional control.

Other CNMS issues carriers are addressing are security, integration with provisioning and billing systems, and the development of better network planning tools.

As these issues are resolved, more and more carriers will allow you to enter and track orders and trouble tickets, perform initial trouble diagnostics, change the network configuration, and even receive and pay the bill using the CNMS.

Carriers have taken strides to interwork frame relay with other technologies and platforms such as X.25, ISDN, ATM, cellular/wireless, and even the public switched telephone network.

The coexistence of legacy and new technologies will provide a migration path to new technologies without causing your current equipment to become obsolete.

Because most interworking services are in their infancy, these services have not been put to the test by a lot of customers.

The carriers consider these to be enhanced services and, therefore, pricing

is neither tariffed nor public. As these services become more commonplace, you can expect additional interworking options, a wider range of availability and publicly available rates.

Henderson and Jenkins are broadband consultants at TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at lhenderson@telechoice.com and tjenkins@telechoice.com.

Sometimes Close is not Good Enough...



It seems that a lot of vendors are taking up the SNA over frame relay game. However, there are no substitutes for the right equipment, plenty of experience and knowing the course when it comes to implementing a winning SNA solution.

Sync is a recognized leader in SNA internetworking and multi-protocol frame relay access solutions. Our award-winning frame relay access products, proven SNA experience, and understanding of the IBM networking landscape has made Sync the number one choice of service providers for their SNA over frame relay managed services.

When it comes to migrating your SNA network to frame relay, avoid hazards -- ask your frame relay service provider for Sync products or call 1-800-ASK-SYNC. Sometimes close is not good enough and you won't get another shot with your network.



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Circle Reader Service #67



Frame relay services

The Short List names the carriers Network World recommends you look at when buying frame relay services. The carriers listed below offer the most flexible, manageable, or customizable services. Furthermore, the carriers are very experienced with frame relay and have a proven ability to deliver enhanced services. The criteria used to select these carriers reflect the needs of users with multivendor enterprise networks. Your needs may differ.

AT&T was selected for the large variety of access options and packages of managed network services it offers. AT&T's complete line of frame relay local-access alternatives includes analog dial-up, ISDN Basic Rate Interface and Primary Rate Interface, switched 56K/64K bit/sec, and interconnection with local exchange carrier frame relay services using the Network-to-Network Interface (NNI). The carrier also has a wide range of managed network services spanning basic network maintenance and management to full outsourcing services.

Sprint Corp. is one of the leaders in giving customers control of their networks. The carrier currently provides online entry and tracking of orders and trouble tickets. Sprint will soon allow customers to add, delete or change permanent virtual circuit and committed information rate assignments using a customer network management system. This gives you greater flexibility in managing and optimizing your frame relay network.

The **UniSpan Frame Relay Consortium** was selected because of its high concentration of frame relay switches and its experience with NNI. Dense groupings of switches enable UniSpan to offer highly reliable network offerings for customers with sites concentrated in regional areas. UniSpan provides service nationwide and worldwide using NNIs to connect its members' nets with local exchange frame relay networks. Interconnections with the local exchange frame relay nets can save you money on local access depending on the network configuration.

When we go to work, we work on **switching**. When we take our customers to lunch, we talk about **switching**. When we talk about our future, we talk about **switching**. When we talk to our friends, we go on and on about **switching**. When we go to bed, we dream about **switching**.

Should you
come to us for
switching?

Yes.

Should you
come to us for
a wild time on
Friday night?
Probably not.



Going out on the town isn't exactly our strong suit. After all, we've spent every minute of every day for the last five years creating switches for every part of a network.

And our obsession has paid off. Our breakthrough ASIC technology has enabled us to develop products for virtually every switching need, whether backbone, workgroup or desktop; Ethernet or Token Ring; even FDDI, Fast Ethernet and ATM. And everything is covered by 3Com's® comprehensive Transcend® network management. The result? We're the worldwide market leader in backbone and desktop switching.

And our switches are getting noticed. Recently, they won the *Data Communications* Tester's Choice Award, the *Network Computing* Well-Connected Award, the *Communications Week* Max Award and *LAN Magazine's* Product of the Year Award.

So for switching help, call 1-800-NET-3Com and we'll send you our *Obsessed With Switching* kit. For information on the hottest clubs in town, you're on your own.



Circle Reader Service #54

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Best of all, Congo Voice Router comes with ACC's agile Web Wizard™, an HTML-based configuration/installation tool. Web Wizard is the only configuration tool on the market today using a Web browser running on a PC. With graphics and hot links to guide you through the installation process, fast ISDN access is just minutes away.

Congo Voice Router comes standard with Web Wizard, two

analog POTS connections, one 10BaseT connection, and an ISDN Basic Rate interface – all wrapped up in a compact enclosure. Congo Voice Router is SNMP and Telnet manageable.



So heed the call of the wild and put the power of Congo Voice Router on your desk today.

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ATM and your campus backbone

Test results show Ethernet users can get on the fast track, but token ring will have to wait.

By Kevin Tolly and Andrew Hacker

While ATM is already in its fifth year of trade show presence, you're likely trying to determine if it is yet the first year for the technology as a viable solution for your production network.

To help you in that effort, we attempted to gauge the state of the industry by building a prototype campus backbone using Asynchronous Transfer Mode to link legacy Ethernet and token-ring LANs and provide high-speed server connections.

The focus was on multiprotocol connectivity, given that performance is meaningless if devices cannot communicate. We evaluated IP and IPX routing as well as NETBIOS bridging using clients and servers on ATM, Ethernet and token-ring LANs. We used ATM Forum-compliant LAN Emulation (LANE) 1.0 for transporting native LAN traffic over ATM. Additionally, we kept careful notes on the complexity and cost of our pilot ATM net, which consisted of two Infinity hubs from Optical Data Systems, Inc. (ODS) housing Cisco Systems, Inc. routers. ODS resells the routers with an ATM switch that it receives from Fore Systems, Inc.

The generally good news is reserved for Ethernet users. Routed IP and IPX traffic was handled flawlessly, whether the connection was Ethernet-to-Ethernet via ATM or Ethernet-to-ATM client-to-server. The switch and routers used the dynamic switched virtual circuit (SVC) approach embodied in the User-to-Network Interface (UNI) 3.0 signaling necessary for LANE to function. Bridging over ATM was not as elegant, as the products we used required permanent virtual circuits (PVC) between routers to be manually configured — a time-consuming task.

The bad news is that if the gear we tested is representative of the industry overall, token-ring network managers will be sitting on the sidelines for some

time. IP and IPX routing do work in both token ring-to-token ring via ATM and token ring-to-ATM scenarios. But source route bridging support, mandatory in token-ring environments, is missing. Without such support, you cannot even begin to consider replacing your core token-ring networks with ATM.

ATM-legacy integration

We circulated a request for proposal for ATM-legacy integration among a number of vendors when the project began several months back. Our approach was to use ATM 155M bit/sec OC-3 connections as fat pipes in the core of our network. They would replace, say, an existing shared 100M bit/sec FDDI environment. Only ODS came forth with a solution that met our criteria.

LANE 1.0, the de jure standard for linking legacy LANs and ATM, is the key to ATM-legacy integration. LANE takes care of setting up connections and shipping LAN traffic in and out of the ATM cloud.

Using a set of functions defined by the ATM Forum, the circuit-based ATM network is made to look like a traditional shared, packet-based LAN

to existing systems such as Microsoft Corp.'s Windows NT and Novell, Inc.'s NetWare.

The Cisco routers support various services — LAN Emulation Configuration Server (LECS), LAN Emulation Server (LES) and Broadcast and Unknown Server (BUS) — to make the entire ATM network appear as a single emulated LAN. All signaling, session setup, segmentation into cells and reassembly into packets is carried out by code in the routers. The Fore switch, running the ATM Forum's UNI 3.0, was called upon to set up dynamic connections between the LANs.

Ethernet and ATM

First, we tried connecting two Ethernet segments. Connecting clients to NetWare (using IPX) and to Windows NT (using IP) over ATM posed no trouble. The LANE code in the routers converted the ATM

Get up to speed on your ATM terms

Broadcast and Unknown Server (BUS)

Component of LANE that handles LAN broadcasts by copying the broadcast packets to all LECs registered with the LES.

LAN Emulation (LANE 1.0)

Architecture developed by the ATM Forum that enables native LAN devices and protocols to communicate over ATM.

LAN Emulation Client (LEC)

Component of LANE that directly interfaces with the native LAN. A separate LEC is needed for each LAN entry point to ATM. When a LAN packet is received by an LEC, it contacts the LES to determine the ATM address of the destination LEC.

LAN Emulation Configuration Server (LECS)

Component of LANE that gives the ATM address of the LES. When initiating a communication, the LEC contacts the LANE server with a standard (i.e., well-known) ATM address. The LECS provides the LANE client with the current ATM address of the appropriate server. The LECS is necessary for multiple LANE servers and multiple Emulated LANs (ELAN). The LEC can contact the LES directly if the ATM address is already known.

LAN Emulation Server (LES)

Component of LANE that maps native LAN MAC addresses to ATM addresses.

RFC 1483

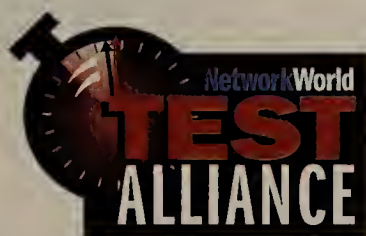
IETF standard specifying the encapsulation of internetwork traffic in AAL-5 ATM payloads.

User-to-Network Interface (UNI 3.0)

Signaling specification developed by the ATM Forum that connects the customer premises equipment, or CPE (PC with an ATM adapter or edge device), to the ATM network, in most cases the switch. UNI 3.0 provides switched virtual circuit signaling.

cloud into a virtual Ethernet network and set up the appropriate SVCs over the switch; our client/server session was instantly established.

The same feat with Microsoft networking using NETBIOS required a few tweaks. For starters, the Cisco LANE code does not support transparent bridging (NETBIOS, by design, cannot be routed). We were forced to abandon LANE and use an RFC 1483 encapsulation of bridging over a PVC (the only method for transparent bridging that was supported by the Cisco code). Setting up a PVC required configuration changes to both routers and the switch,



which were made without taking the switch or router offline. While only a single PVC is required between any two communicating Ethernet LANs, this is an arduous task for a more complex network with a higher number of such connections.

Next, we attached the NetWare and NT servers directly to the ATM switch with Olicom 155 PCI adapters running Olicom USA, Inc.'s LANE drivers. Routing IP and IPX was, as before, handled flawlessly by LANE. However, the version of LANE code in the Cisco routers did not allow bridged NETBIOS to flow in this configuration.

Token-ring tribulations

Moving on to the first token-ring scenario, we placed our client and server on two separate token-ring LANs linked via the ATM backbone. Routing IP and IPX over the backbone went off without a hitch.

But when we attempted to bridge token-ring LANs via ATM, we hit a brick wall. Source route bridging, mandatory in token-ring environments, is not even an

option here. As stated earlier, the emulated LAN appears as an Ethernet network. Since Ethernet does not support source routing, the issue of source route bridging becomes moot.

Next, we tried a token-ring client and an ATM server. The server used the same Olicom adapter as in the Ethernet tests. We had no trouble with IP and IPX routing, but, as with the Ethernet to ATM scenario, we could not get NETBIOS working due to the lack of source routing support.

To finish the barrage of scenarios, we connected a token-ring client to an Ethernet server over ATM with similar results: IP and IPX routing was fine, and bridging NETBIOS was not possible.

Logically, the connection-oriented nature of ATM, developing standards and new terminology contribute to a steep

ATM backbone connectivity matrix

Client location	Backbone topology	Server location	IP routing	SCORE	
				IPX routing	Bridging
Ethernet	Ethernet emulated LANE, RFC 1483 Ethernet over permanent virtual circuit for transparent bridging	Ethernet	✓	✓	✓*
Ethernet	Ethernet emulated LANE	ATM	✓	✓	NA
Token ring	Ethernet emulated LANE	Token ring	✓	✓	NA
Token ring	Ethernet emulated LANE	Ethernet	✓	✓	NA

Key:

- ✓ = Supports protocol, little manual configuration required.
- ✓* = Supports protocol, extensive manual configuration required.
- NA = Not applicable; does not support.

SOURCE: THE TOLLY GROUP

option here. As stated earlier, the emulated LAN appears as an Ethernet network. Since Ethernet does not support source routing, the issue of source route bridging becomes moot.

The Olicom ATM adapter we used does support the 802.5 LANE encapsulation needed for token-ring emulated LANs, but we couldn't use it for the same reason described above.

Most routing vendors, including Cisco, expect to support token-ring LANE in the near future. Other vendors, such as NetEdge Systems, Inc., currently support token-ring source route bridging over ATM via PVC.

The only way to communicate between a source route bridge network and a transparent bridge network is translational bridging, where source route bridging is translated to transparent bridging. In the test scenario, source routing had to be terminated at one edge of the ATM cloud and reassembled at the other. That means the routers strip all source routing information from each packet, make bridging

decisions over the Ethernet network based on that information, then put the source routing data back on when the packet gets to the other side.

Such translational bridging has been one of the worst nightmares of the inter-networking era. It is never a good idea to attempt this as it is complex and usually fails.

Complexity of configuration

We found that ATM and ATM-LAN integration adds significant complexity to network configuration, management and ongoing operations. This complexity, as with any new technology, stems from both unfamiliar and, in the case of standards, evolving logical attributes and the need for additional physical configuration.

Logically, the connection-oriented nature of ATM, developing standards and new terminology contribute to a steep

HOW WE DID IT

Each of the two Optical Data Systems, Inc. Infinity hubs on our campus backbone contained an ODS 1094-CS7000 edge router, which is a repackaged Cisco Systems, Inc. 7000 series router with a 155M bit/sec OC-3 uplink. In addition, one of the hubs housed a 1094-ASX-200BX ATM switch, a relabeled Fore Systems, Inc. ASX-200BX. The ODS routers were each outfitted with Ethernet, token-ring and ATM modules (see graphic). We used the 1094-ASX-200BX ATM switch to connect the two routers via ATM and to connect a server directly to the ATM backbone.

Next, we configured IP and IPX routed networks for each LAN and used the ATM Forum-compliant LAN Emulation (LANE) code built into the Cisco Internetwork Operating System 11.0(3). One router was first configured as the LANE Configuration Server (LECS), LANE Server (LES), and Broadcast and Unknown Server (BUS), and then both routers were configured as LANE Clients. The 1094-ASX-200BX switch ran ForeThought 3.4.2g(1.1) code.

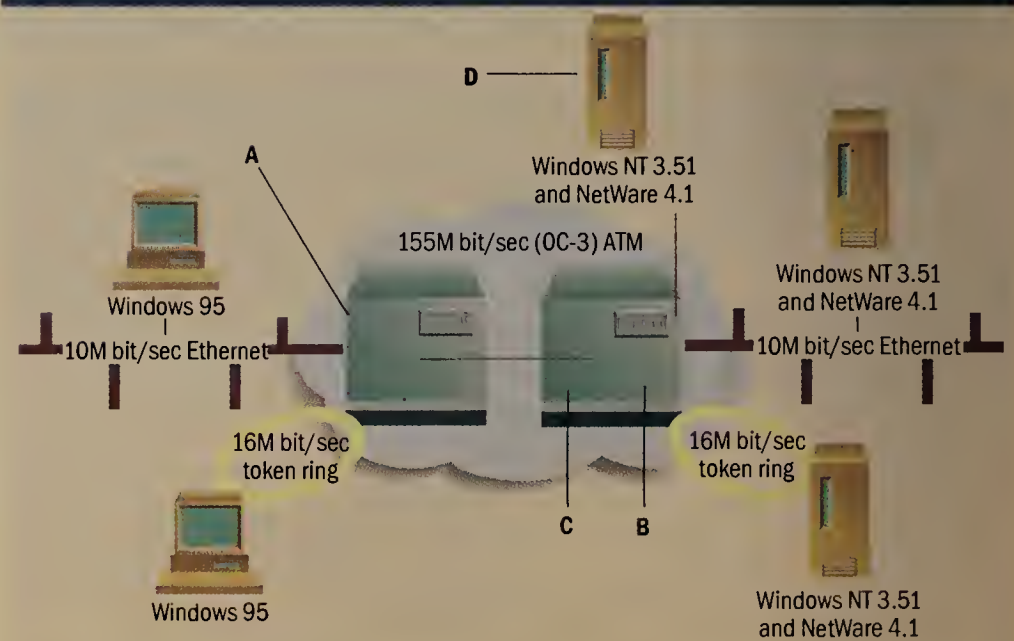
For the LAN-to-LAN configurations, we connected a 10M bit/sec Ethernet and 16M bit/sec token-ring LAN to each router. We then attached a Microsoft Windows 95 client to the Ethernet and token ring on the first router and a Microsoft Windows NT 3.51 and NetWare 4.1 server to each LAN on the second router.

For the LAN-to-ATM configurations, we removed the second router and connected the servers directly to the ATM switch via an Olicom USA, Inc. PCI OC-615X 155M bit/sec adapter. The adapter ran ATM Forum-compliant Olicom LANE 1.0 drivers for NT and NetWare.

The Windows 95 clients used the networking protocol stacks and network operating system clients provided by Microsoft. LAN adapters for the clients were a Madge Networks, Inc. Smart Ringnode and a 3Com Corp. Etherlink III. The NT server ran Microsoft NT IP and NETBIOS stacks, and the NetWare server ran IPX. The LAN adapters we used for the servers were an IBM Adapter II 16/4 and a 3Com Etherlink III.

To verify connectivity, we transferred an 8.7M-byte file using the FTP utility that comes with Windows 95 for IP, and the DOS COPY command for IPX and NETBIOS.

Test bed diagram



PRICING FOR TEST BED

Component	Description	Unit price	Qty.	Total
A	ODS Infinity Hub Includes: Chassis, backplane and two power supplies	\$9,190	2	\$18,380
B	1094-CS7000 (OEM of Cisco 7000) Includes: Chassis ATM interface Dual Ethernet interface Dual token-ring interface Silicon switch processor	\$75,480 \$19,080 \$26,400 \$13,800 \$8,400 \$7,800	2	\$150,960
C	1094-ASX-200BX (OEM of Fore Systems ASX-200BX) Includes: Chassis Four port OC-3 interface	\$33,680 \$27,435 \$6,245	1	\$33,680
D	Olicom USA PCI OC-615X OC-3 adapter	\$985	1	\$985
				\$204,005

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learning curve. Multicast protocols aside, each ATM session is a direct connection between two devices transferring data. This necessitates a new set of analysis tools and procedures different from those used for broadcast-based shared LANs. Net managers must learn terms such as LANE Configuration Server, Emulated LAN and Interim Local Management Interface (see story, page 63).

And anyone unfortunate enough to have to troubleshoot a connection gone awry must make the transition from the traditional 6-byte LAN media access control address to a whopping 20-byte ATM address.

Physically, configuring an ATM network requires learning the operation of at least one completely new device: the switch.

Additionally, some extra work must be done to get routers and servers connected. Although not a major task with SVCs, some configuration must be done on the switch to set the correct signaling protocol and parameters such as bandwidth allocation.

Check out Network World Fusion for a discussion of issues in the planning and migration to ATM networks. Select NetRef, Buyer's Guides and Reviews, then ATM.

Network World Fusion
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The router and any servers having their job descriptions changed to ATM-based resource must be given new interfaces and have all associated LANE parameters and definitions configured. This required an extra five or so lines in the Cisco configuration file and was, thankfully, an even easier task for the Olimcom adapter.

Once the switch and routers were configured (including traditional pre-ATM router setup), the rest was plug-and-play. The LAN clients, with traditional LAN drivers, connected seamlessly to their ATM- and LAN-based servers.

So what's it all cost?

Although prices, in general, are coming down, the ATM connections for this implementation are still quite expensive. The Fore switch outfitted with a single four-port card costs \$33,680, and the base router costs \$19,080. Worse, the single-port ATM OC-3 card for the Cisco router costs \$26,000. After this, the Olimcom PCI server adapters seem like a bargain at just under \$1,000.

On the plus side, existing fiber cable can be reterminated for ATM (although the termination is usually the majority of the cost for a fiber run) and LAN clients need no modification or accompanying investment.

Cost issues aside, the results here are actually quite encouraging, given the complete lack of standards-based interoperable products we encountered in previous ATM tests.

Clearly, those of you with networks

based on Ethernet running purely IP and IPX will have the easiest time integrating ATM technology both as a backbone topology and for server connections.

On the other hand, while we did not evaluate a multiswitch environment, few vendors advertise interoperability between switches for critical SVC support. So, in the near term at least, it appears safer to procure all ATM switches from a single vendor. ■



The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 49.

Tolly is president and CEO and Hacker is senior engineer/analyst at The Tolly Group, a strategic consulting, independent testing and industry analysis organization in Manasquan, N.J. For more information, visit The Tolly Group Web site at <http://www.tolly.com>, call (800) 933-1699 or send E-mail to ktolly@tolly.com.

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Briefs

■ **New Riders Publishing** has released **Internet Security Professional Reference** to teach users how to protect their networks and alert them to hacker tricks. Firewalls, Pretty Good Privacy (PGP) software, Java security, Kerberos authentication, Security Tool for Analyzing Networks (SATAN), IP spoofing and sniffing, daemons, Common Gateway Interface (CGI) security, auditing, encryption and viruses are discussed.

The book also comes with a CD-ROM that includes shareware versions of Kerberos, PGP, Trusted Information Systems, Inc.'s TIS Toolkit and SATAN utilities, and a complete list of all Request for Comments relating to Internet security.

The book/CD-ROM set (ISBN No. 1-56205-557-7) costs \$60.

■ **New Riders** is also offering help to those looking to become **Microsoft Certified Systems Engineers (MCSE)**. A study guide covering two elective courses, TCP/IP and Systems Management Server (ISBN No. 1-56205-588-7), is due this month. Another guide, covering two core requirement courses, Windows NT Server 3.51 and Windows NT Workstation 3.51 (ISBN No. 1-56205-549-6), is planned for September publication.

Each book includes a CD-ROM containing test questions for measuring competency and costs \$70.

New Riders: (800) 428-5331.

■ **The OSF DCE User & Developer Conference** will be held in Boston **August 4-8**. There will be sessions on DCE technology, tools, products and deployment; Common Object Request Broker Architecture and Microsoft Corp.'s Component Object Model and OLE compound document architecture; and DCE security and the World-Wide Web.

The full conference fee is \$1,495; one- to three-day packages cost \$345 to \$995.

OSF DCE User & Developer Conference: (800) 767-2336.

Managing CTI requires integrated skills

As local nets and PBXs unite, so too must your telecommunications and MIS staffs.

By Ram Tackett

Alright all you LAN people — admit it. It wasn't so long ago that telephony concerns only entered your mind when placing a long-distance call. After all, you had a network to run. Well, those blissful days are numbered.

Siemens Rolm Communications, Inc. introduced the first computer-to-private branch exchange link in 1989 with hardware and software connecting to an IBM mainframe. This enabled IBM to develop CallPath, the industry's first widely used computer-telephone integration (CTI) framework.

Since then, CTI technology for the LAN has made great strides. Research company Dataquest, Inc. in San Jose, Calif., predicts that more than 14% of the LANs and PBXs in existence today will be integrated by year-end. Dataquest analysts see the

department.

Managing CTI today is no walk in the park. You need a top-notch CTI team, staffed with people proficient in one or more of these areas: telecommunications, networking and application development.

The telecommunications manager usually handles wiring, setup and maintenance of the telephony system. The MIS manager has all the applications, databases and networking. So CTI falls in between, and, therefore, the question is, who is in charge? Managing the CTI link itself does not turn an MIS manager into a telecommunications expert, and vice versa.

Generally, installation of a CTI link will not make the telecommunications manager's job obsolete. Rather, it will increase the communication between the two departments.

"We see most telecom departments reporting up into common management with their data networking counterparts," says Paul Stanton, Microsoft's program manager in the Windows Networking and Communications Group. "There will be merging of what had been separate functions. The trend on the horizon is towards more integrated network services."

Alec Belfer, executive vice president of marketing at CallWare Technologies, Inc., which produced the first LAN-based voice and call-processing NetWare Loadable Module, advises that you keep an eye on emerging standards (see glossary) as well as ActiveX and LiveAudio technologies.

You'll also need to become familiar with the different categories of CTI applications. These currently include interactive voice/fax response, intelligent call management and unified messaging.

For instance, an Integrated Voice Response system is a lot easier to implement (and requires different technologies) than a call-center application. Your choice will also depend on the existing telephony infrastructure of your organization.

"The market is struggling through the integration issues of

implementation.

Of course, you don't have to do the implementation yourself; you can always outsource the project. But experts caution that you understand what you're buying. With outsourcing, the issue will always be support. Get sufficient commitment to technical support in writing.

"The one thing CTI vendors and implementing managers often forget is who will support

Skills your team needs

- ▶ Core business understanding. Business need drives the technology.
- ▶ "Outside of the box" reasoning. Think network services, not voice or data.
- ▶ Telecom skills: reliability and interconnectivity.
- ▶ Computer networking skills: fault-tolerance, redundancy and recovery.
- ▶ Application development or systems integration skills.

"There is a huge amount of hype and little substance in the industry," according to Pronexus' McCallum. Products are not quite there yet, and many equipment suppliers are talking the talk but actually dragging their heels about the introduction of truly open systems. These open products aren't drop-in solutions. You'll still need people who specialize in bridging the gaps between open APIs and proprietary vendor solutions. Therefore, managers should have realistic schedules for

the application over its life," says Chris Thompson, a telecommunications analyst with Dataquest, Inc. Moving from proprietary to open a la carte solutions, customers often don't realize that systems integration is no longer part of the purchase price.

Tackett is an industry analyst with Houston-based Currid & Co., a research and technology assessment firm. He can be reached at (713) 789-5995 or via E-mail at tackett@currid.com.

CTI glossary of terms

CSTA — Computer Supported Telephony Application, a standard for Open Systems Interconnection application-layer protocols (Layer 7) for communications between a computing network and a switching network.

First Party Call Control — Desktop-oriented services that are not sharable and that have complete control over one CTI device.

NTS — NetWare Telephony Services from Novell. Based on TSAPI.

TAPI — Microsoft's Telephony Application Programming Interface.

TSAPI — Telephony Services Application Programming Interface from Novell and AT&T.

Third Party Call Control — Sharable server-based services for workgroups or the enterprise, where a group of people use the applications.

TAPI is the most popular desktop and first-party standard, whereas NTS dominates the server-to-PBX market for third-party call control. The lines will blur with the inclusion of TAPI 2.0 in the forthcoming Windows NT 4.0, which will enable third-party call control.

"TAPI and NTS haven't yet reached a dominant role outside of workgroup solutions," cautions Chris Thompson, a telecommunications analyst with Dataquest, Inc. Each of the major switch vendors are also playing the game, owning CTI link products such as Meridian Link from Northern Telecom, Inc.

Plug in to Network World Fusion for more on CTI, including:

■ **How one company is using IVR technology to access business data.**

■ **A series of white papers on the latest in computer telephony technology.**

■ **An article about synchronizing telephone calls and data on the desktop.**

■ **How to make NetWare CTI applications available over Centrex.**

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total CTI market growing from more than \$1 billion to close to \$7.4 billion by 1999.

"CTI technology is quickly becoming the go-to technology for businesses seriously looking at efficiency and ways of trimming operating costs," notes Bob McCallum, marketing director for Pronexus, Inc., a provider of Telephony Application Programming Interface software tools for Visual Basic. That means you need to figure out who will build and support these systems, and whether the advent of CTI in your organization may require a separate CTI

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VOICE/DATA NETWORK ENGINEER Strong background in large voice/data networks; experience with Analog/Digital services, pbx, voice

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Specific minimum qualifications in addition to those generally stated include: 5 years in a sales management position with outside sales experience in the sale of LAN/WAN solutions (Navell, Banyan, Micrasoft), a knowledge of network operation systems, hardware (Netframe, Campaq, Cisco) and network applications, proven prospecting and presentations skills.

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Specific minimum qualifications in addition to those generally stated include: 5 years in a management position with experience in technical sales presentations, LAN/WAN design, and project management, MSCE, ECNE, or CBE certification(s) (others a plus), a minimum of 5 years experience in direct network support and in the development and presentation of proposals to customers in a sales oriented environment.

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Specific minimum qualifications in addition to those generally stated include: MSCE, ECNE or CBE certification(s) (others a plus) proficiency in LAN/WAN design, strong communication skills assist in the development and presentation of technical sales proposals, project management and direct network systems and installation support.

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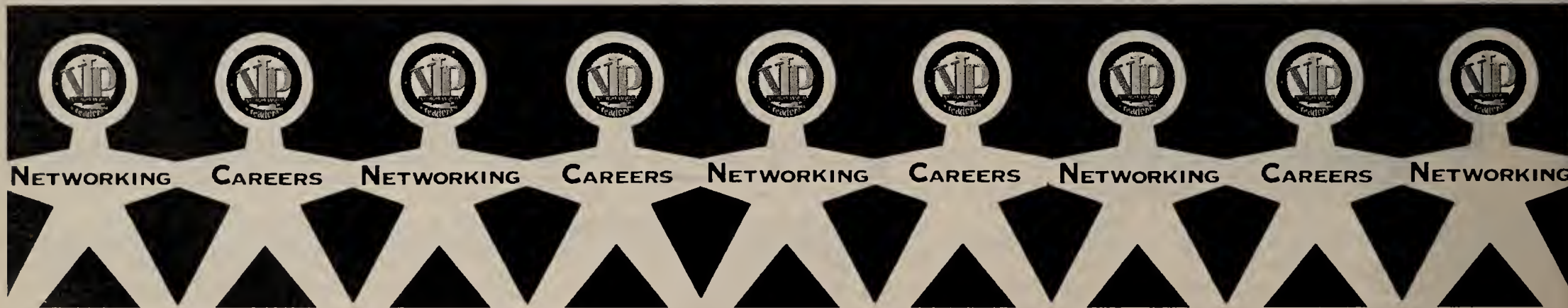
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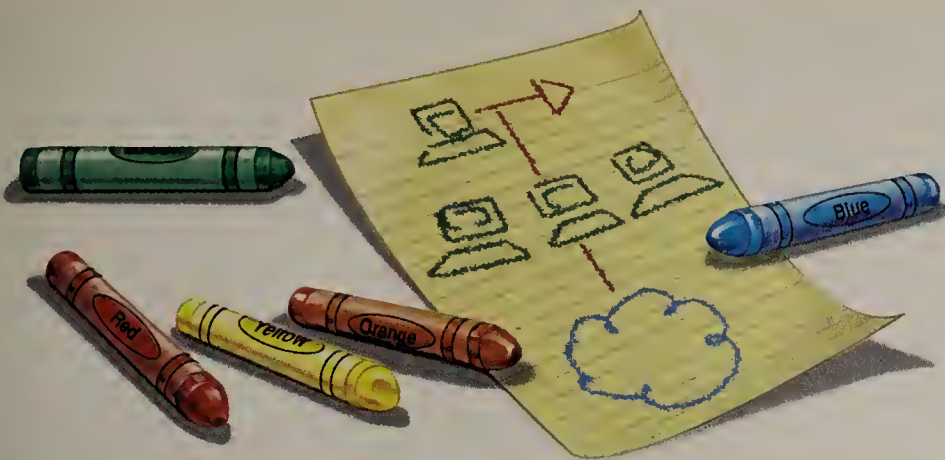
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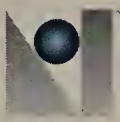


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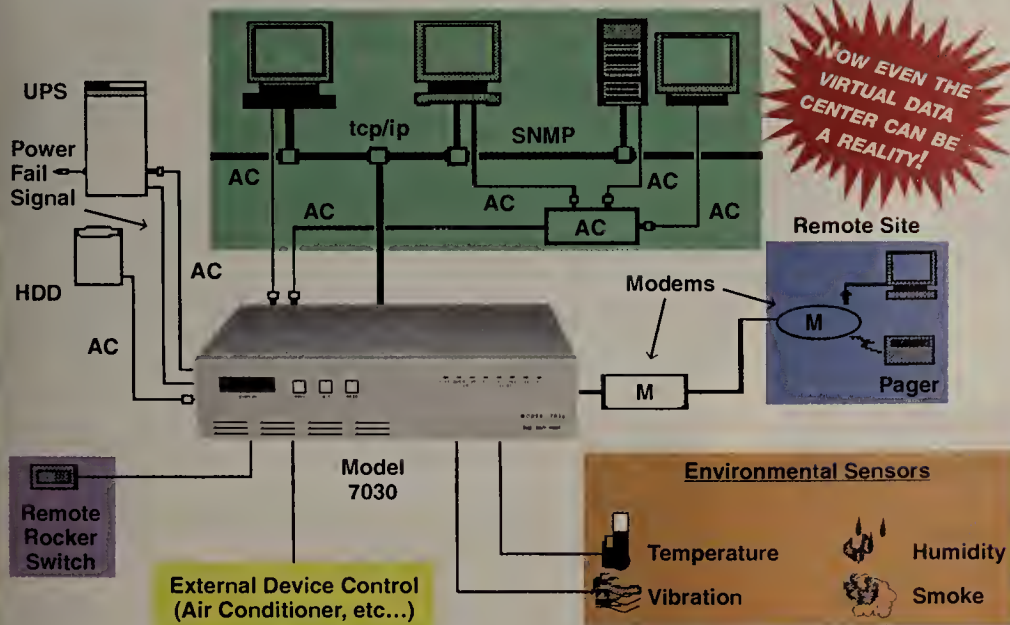
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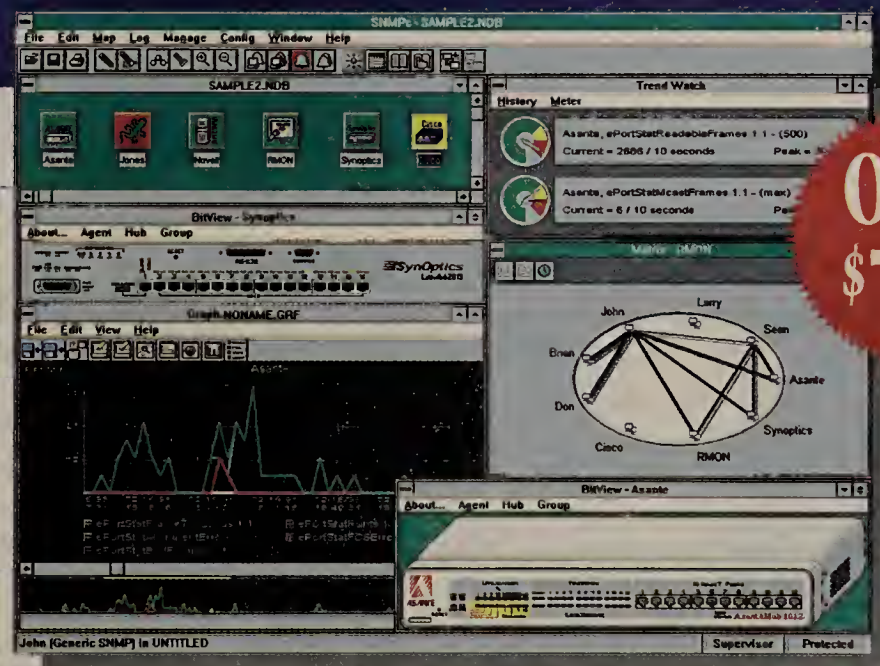
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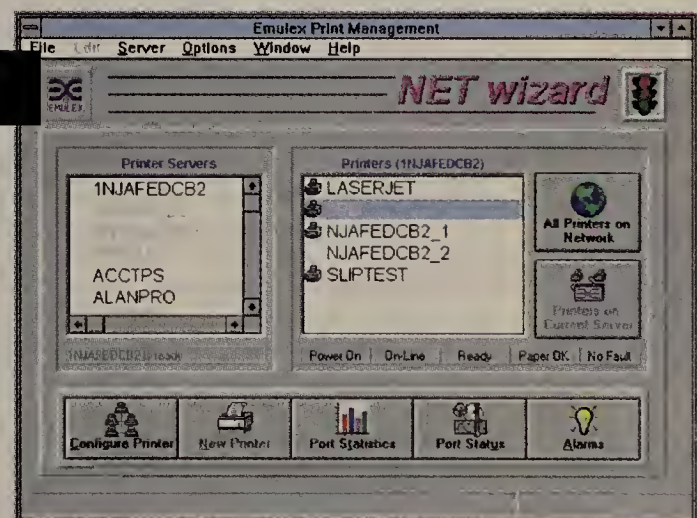
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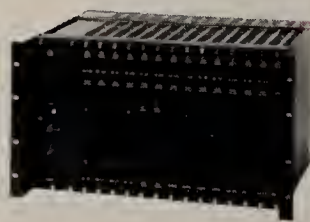
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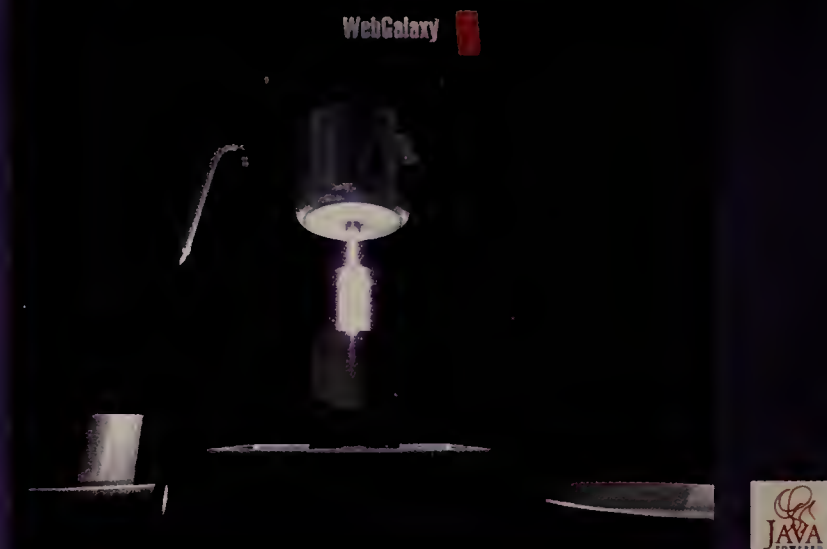
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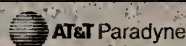
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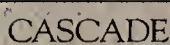
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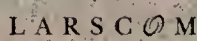


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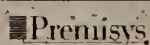
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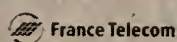
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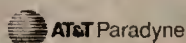


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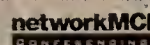


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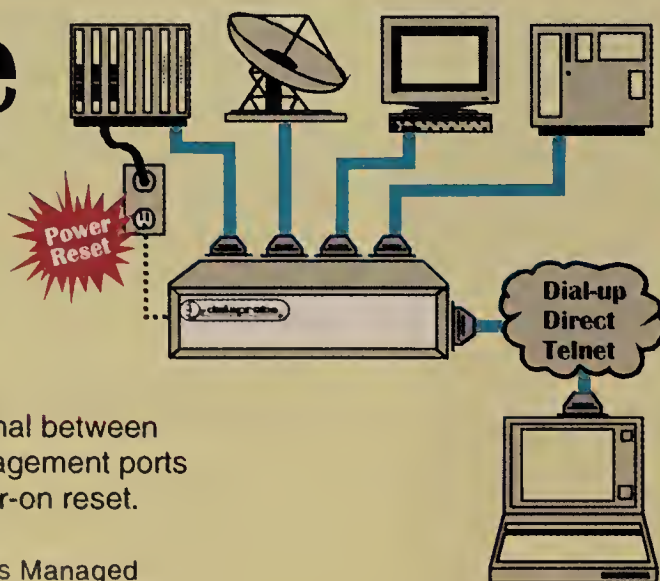
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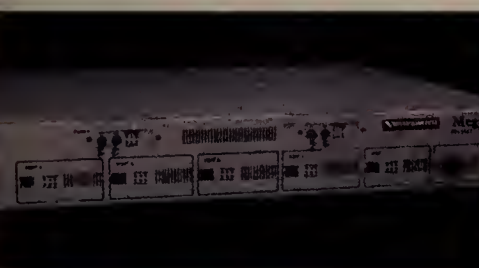
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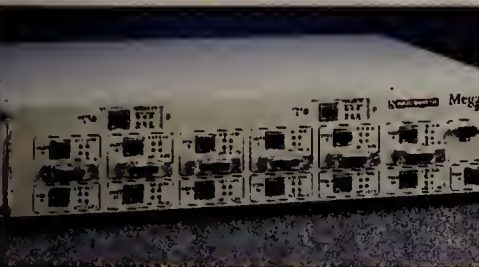
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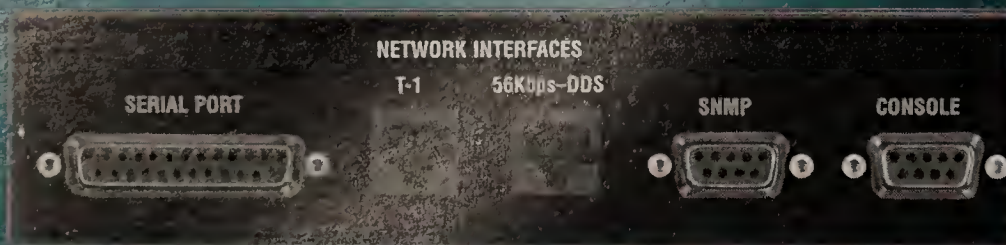
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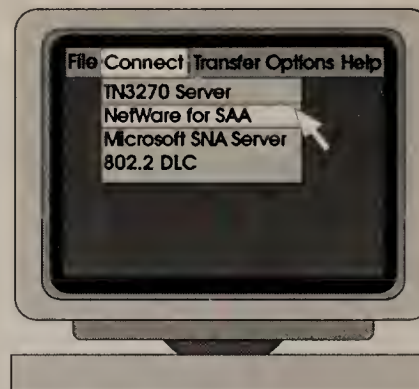


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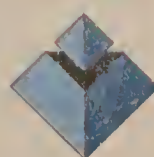
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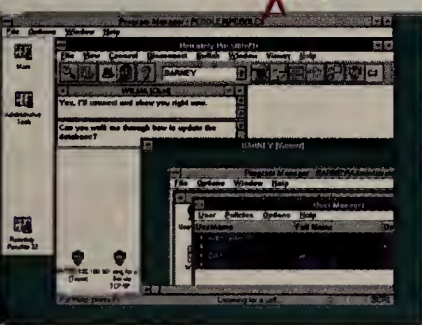
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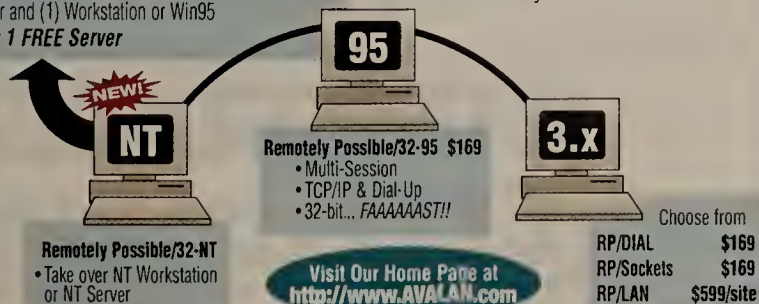
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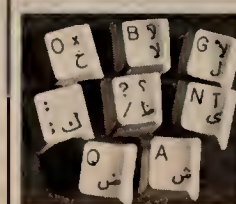
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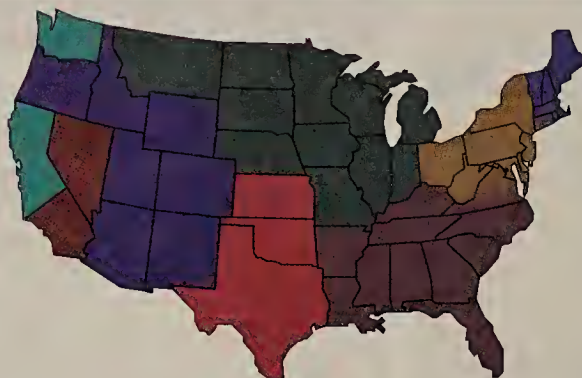
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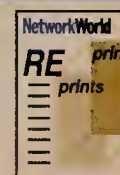
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Microsoft

Continued from page 1

Enderle said. Its plan is anchored by Windows NT on the back end, and the new Web-enabled Office 97 desktop application suite, an integrated Windows browser on the front end.

During last week's daylong intranet briefing, Microsoft previewed a variety of products, including its:

- Office 97 desktop application suite, featuring hyperlinking, searching, navigating and HTML content creation; and a new information-management application, called Outlook, for managing E-mail, schedules, tasks, contacts and files.

- Internet Explorer 4.0 Web browser and Windows Active Desktop technologies that facilitate access to information, regardless of location, and notify users when documents of interest on an intranet or the Internet are updated.

- Windows NT Server 4.0, with a search server (code-named Trip-

oli) and the FrontPage 1.1 Web authoring tool built in. It also will include a new Directory Server, combining Domain Name Service and X.500, and supporting the Lightweight Directory Access Protocol.

- Windows NT 5.0, scheduled to ship next year, featuring clustering capabilities.

- Exchange 4.1, featuring support for POP3 and Network News Transport Protocol.

- Visual Basic 5.0 and J++ (formerly known as Jakarta).

- Viper, a server product that combines transaction monitoring and object request broker capabilities.

- Common Internet File System (CIFS), a technology for file sharing over intranets and the 'Net. CIFS, a previously obscure protocol known as Server Message Block, will be positioned to go up against Sun Microsystems, Inc.'s Network File System and WebNFS technologies.

Digital Equipment Corp., Intel Corp., Network Appliance, Inc. and others pledged support

for CIFS, which Microsoft has submitted as an Internet draft standard. Assuming Microsoft delivers on all its promises, Enderle thinks the race for intranet dominance will be "Micro-

Corp. continuing to dominate the Web browser wars and gain support for its server software.

"This does demonstrate the strength that Microsoft can wield . . . but there's room for more

technologies.

"If Microsoft is going to succeed, it will be on the strength of ActiveX," which is based on Microsoft's OLE technology, said Dave Kelly, director of the

Netscape puts it in writing

Not to be out-manuevered in the escalating Internet wars, Netscape Communications Corp. last week released an intranet white paper on the eve of Microsoft Corp.'s day-long intranet briefing session.

According to the white paper, dubbed "Intranet Vision and Product Roadmap," the next generation of Netscape's Navigator client software, code-named Galileo, will feature collaboration capabilities, including off-line support for electronic mail and discussion groups; Java class libraries; forms created via templates; and automatically loaded plug-ins.

The new elements will be added to upcoming releases of Navigator over the next 12 months.

Netscape's next-generation server line, code-named Orion, is due out within 18 months. It will include server agents that can perform specific programmed functions, such as notifying users when documents are updated; replication services; directory services based on the Lightweight Directory Access protocol; an integrated Java and JavaScript application engine; central management capabilities from the Navigator browser; and public-key certificates.

Netscape's complete white paper can be found at http://home.netscape.com/comprod/at_work/white_paper/intranet/vision.html.

—Carol Sliwa

soft's to lose."

Others aren't quite so ready to make that concession, with rival Netscape Communications

than one player," said Ted Julian, Internet commerce research manager for International Data Corp. in Framingham, Mass. "I don't think by any means one could reasonably come up with a scenario in which Netscape isn't a player."

Netscape is banking on the open Java development language, while Microsoft — in addition to supporting Java — is pushing its own ActiveX

application strategies service for Hurwitz Group, Inc. of Newton, Mass. "Microsoft needs a compelling reason to get users to switch browsers. The most compelling reason will be the ability to easily and quickly create Internet business applications."

Netscape still holds a big lead in the Web browser wars, but analysts have been predicting the tide will turn, with Microsoft giving its browser away. ■

CDA

Continued from page 1

net high road, they will have to set guidelines and restrictions themselves.

Users speak freely

Chuck Kluko, a systems engi-

neer at Goldco Industries, Inc. in Loveland, Colo., said that since only a few employees have direct Internet access, his company does not yet have a problem with employees accessing or putting questionable material up on the 'Net. However, he anticipates that as more users gain access to

the 'Net, questions of censorship might arise as they did when the company implemented its electronic mail system.

"There have been cases when users would put out an E-mail announcing a birthday party or something to be held at a particular bar. Maybe that's inappropriate, maybe it's not? Then I would get a call from human resources telling me to stop things like that," Kluko said.

"Right now, I am basically straddling the fence on this censorship issue. Now with this court ruling in place, I guess I'm just lucky enough that for the time being my legs are long enough to touch the ground on both sides," Kluko said.

Some believe that the act never had teeth to begin with. "We will not be taking it into our own hands to enforce any sort of policies regarding indecency. The original act was virtually unenforceable, so there was never any fear around here that we would be held responsible for material that people posted," said Ronald Hudson, assistant director of network services at Johns Hopkins University in Baltimore.

"It's far too early to say that the decision changes our policies at all," said Clarence Beck, coordinator of information management with the Argonne National Laboratory in Argonne, Ill. "We do have internal policies in place with regard to Internet access and what users are allowed to access."

Some users said they feel corporate policies are sufficient, with no need for government interference. "It's all much ado about nothing. At work, [inde-

der, interim network manager at Domino's Pizza in Ann Arbor, Mich.

"You can't have governmental agencies saying what's acceptable and what's not," said Paul Edmunds, senior network analyst at Duke Power Co. in Charlotte, N.C. "I was quite happy to see [the ruling]."

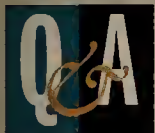
One user said he is just pleased not to have to deal with CDA restrictions.

"The concept of indecency was so vaguely defined that we would be inclined to err on the side of really restricting the material that we made available to our constituents and to the world via the Internet," said Ray Grant, director of Information Technology Services at Portland Community College in Oregon.

Observers praised the insight of the 175-page ruling, which at times read like a sophisticated Internet primer.

"They showed a fantastic ability to understand the global, decentralized nature of the Internet," said Boston attorney Lee Gesmer, a specialist in computer and intellectual property law. The court's thoroughness will help protect its decision, he added. ■

What the CDA ruling means to you



Here are answers to some basic questions about the court decision.

Does the overturning of the Communications Decency Act (CDA) mean that it is OK to post anything on the 'Net?

No. Existing laws against child pornography and obscenity apply regardless of the medium used for distribution. Obscenity refers to material that appeals to the prurient interest, and generally applies to hard-core sexual material.

The CDA, however, made "indecent" material illegal. Indecent is a broader term than obscene, and could apply to much less risqué material.

Is the CDA dead for good?

That all depends. The Supreme Court may take up and ultimately resolve the issue.

Does this overturn the whole Telecommunications Act of 1996?

No. This appeals court only ruled on the CDA provision, which was slipped into the telecommunications reform act at the last minute.

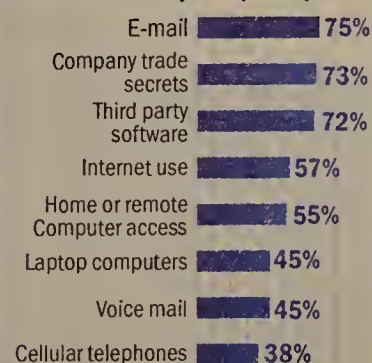
Why did the judges overturn the decision?

They had several reasons. For one, the 'Net is international, which means the U.S. cannot control what originates from overseas. More importantly, they believed that the type of speech outlawed by the CDA is not only vague, but protected by the First Amendment.

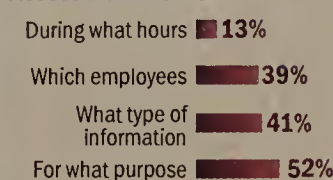
—Doug Barney

Internet policies say what?

Items covered by computer policies



Access issues covered



SOURCE: GOROON & GLICKSON P.C.

cent material] is a personnel issue, not a technology regulation issue. There are already policies in place about proper work behavior, whether you're talking about magazines, computers or something else," said Bill Kid-

Java

Continued from page 1

wick & West, the Palo Alto law firm representing Sun, he was not amused.

"This is the kind of bother you don't need," Keith said.

The letter ended with attorney James Gibbons-Shapiro urging Keith to confirm "that your company will immediately take the requested actions."

According to Keith, that is not going to happen. "It's still on the 'Net, and I don't have any intention of taking it off," he said. On advice from counsel, Keith would not comment further on the case.

Jon Batcheller, however, has plenty to say about Sun's efforts to assert ownership of all things "java" on the 'Net.

Batcheller, a software engineer from Portland, Ore., started a personal Web page last year with the URL www.javac.com. The site reflected his interest in the Java and C programming languages, and featured items such as articles about software.

"To me, it really doesn't make any sense," Batcheller said. "If I were Sun, I would think I had much more to lose [in terms of bad publicity] than to gain doing this."

Shortly after receiving his own letter from Sun lawyers, Batcheller transformed his Web

site into a rallying point for owners of other Web sites with "java" in their names.

Batcheller sent a mass E-mailing to administrators of these other 165 sites — some of which

Java this and Java that

As of June 5, there were 166 domain names containing the word "java." Below is a sampling:

▶ autojava.com	▶ javafund.com
▶ cup-o-java.com	▶ javahead.com
▶ cupajava.com	▶ javajive.com
▶ hangnjava.com	▶ javamania.com
▶ hyperjava.com	▶ japanese.com
▶ javac.com	▶ javasurfers.com
▶ javacentric.com	▶ javatrain.com
▶ javaclass.com	▶ lajava.com
▶ javadog.com	▶ teamjava.com

For a complete list, visit <http://www.javac.com/doms.html>

are Sun-related — and discovered that many of them also have been contacted by Sun legal representatives.

One respondent, Ray Taft, said he "has been in legal talks with [Sun lawyers] for over five months now."

Taft, who calls himself a big supporter of the Java language, started a site earlier this year, www.javacup.com, that provided links for entries into Sun's Java-cup International contest.

Rather than make any money, Taft said, he merely intended to showcase the uses of Java and informed Sun about his intention.

But he shut down the site after Sun alleged trademark infringement. He also told Sun he would relinquish the javacup.com domain name in return for a letter from Sun absolving him and WebPlanet, the Internet service provider he runs, from further legal action.

He has not yet received such a letter and no longer owns the domain name, which expired Friday.

Anne Gundelfinger, associate general counsel and director of trademarks for Sun, declined to comment on Sun's correspondence with domain name holders regarding the Java trademark, but said, "We are protecting our rights on the Java trademark, and we are enforcing and will enforce the mark."

Mark Schonfeld, a Boston attorney who specializes in intellectual property law, said the test of trademark law is typically whether the disputed name would "cause confusion" with the trademarked name.

Schonfeld said while domain name disputes can be settled by Internet Network Information Center, the organization that registers domain names, many such cases end up going to court. ■

Name calling

There have been numerous domain name disputes in recent years involving large corporations alleging trademark infringement. Some of the better known cases include:

■ Warner Bros and Roadrunner Computer System

Warner Bros., owner of the registered trademark Road Runner, complained to Network Solutions, Inc. (NSI) in December about Roadrunner Computer's use of roadrunner.com as a domain name. NSI said it would place the domain name on hold.

Meanwhile, Roadrunner obtained a trademark registration in Tunisia, but NSI refused to allow the company to retain the domain name.

On June 3, NSI announced that Warner Bros. would no longer pursue the domain name issue and that NSI would ask a federal court to dismiss Warner's suit. Roadrunner is using www.roadrunner.com as its URL.



■ McDonald's and Joshua Quittner



Quittner, a writer for *WIRED* magazine and *Newsday*, registered the domain name mcdonalds.com a couple of years ago to illustrate the flaws in NSI's registration system. After some debate, McDonald's agreed to donate money to a charity in return for Quittner relinquishing mcdonalds.com.

■ PETA and Mike Doughney

Doughney published a satirical Web page called People Eating Tasty Animals. People for the Ethical Treatment of Animals demanded that he turn over the domain name peta.com. Doughney refused, but the InterNIC put the domain name on hold after PETA complained. The name is in limbo.

Information on these cases was compiled from the Georgetown University Law Center's Web site (<http://www.law.georgetown.edu>).



— Chris Nerney

AT&T

Continued from page 1

The schism is also splitting the normally solid bloc of opposition to RBOC lobbyists, who are trying to stop the Federal Communications Commission

works at multiple points. The RBOCs, along with state regulators, argue that local conditions around the country differ.

Among key AT&T demands being shrugged aside by MFS and others are full-featured telephone number portability and

investments in network plant and equipment (see graphic).

Doing what needs to be done

Analysts and RBOC officials who have been negotiating with potential competitors said AT&T is demanding stringent terms because it does not have any other choice.

Without switches and fiber cable of its own, AT&T must essentially rent all its local facilities from RBOCs to reach businesses and homes. By contrast, MFS and cable companies either must buy only a few local network elements or simply make arrangements for handing traffic back and forth with the RBOC.

"The differences between the two are big and getting bigger," said a NYNEX Corp. official who asked not to be identified. "[The differences] are based entirely on the fact that one's strategy is based on resale while the other is facilities-based."

In a prime example, AT&T officials last week criticized the recently signed regionwide interconnection agreement between MFS and Ameritech

Corp. (NW, May 27, page 6). Among other things, AT&T complained that Ameritech established only two unbundled local network elements for MFS to buy — the entire local loop from the central office to the premises and the ports on the CO switches.

AT&T is demanding separate prices for 11 different local network elements, including three in the local loop alone (NW, April 29, page 31). The Ameritech-MFS agreement and others like it "do not come close to fulfilling the requirements of the [telecommunications reform] act or the needs of AT&T," said Steve Davis, AT&T's legal vice president for interconnection matters.

MFS officials countered that, to get Ameritech to agree to 11 unbundled network elements, it would have taken months longer at a time when users are expecting action, not bickering. "We have immediate needs," said Andrew Lipman, senior vice president of legal and government affairs for MFS. "We know

what we need, and we know what we want."

Another sticking point is AT&T's insistence that RBOCs base their wholesale pricing on exact cost formulas. This is unrealistic, Lipman argued. "The incumbent [carrier] holds all the cards," he said. "They hold all the numbers."

Whose fault is it?

The backlash against AT&T's demands came out in the open last week after AT&T Chairman and Chief Executive Officer Robert Allen infuriated RBOC officials with statements before a group of securities analysts. Allen said the RBOCs would not be able to enter the long-distance business until the year 2000 because their interconnection proposals do not meet the competitive checklist required in the telecommunications act.

Maybe AT&T is just frustrated. "The status of negotiations [with RBOCs] is a mixed bag," AT&T's Davis wryly commented. "Generally, it goes from poor to so-so." ■

Doth AT&T protest too much?

In five key areas, AT&T is demanding harsher terms in its RBOC interconnection negotiations than is MFS:

Issue	AT&T's position	MFS' position
Wholesale discounts for resale	Demands 25-45% discounts from RBOCs	Is willing to accept 10% or less
Accounting for wholesale discounts	Demands RBOCs subtract all "avoidable" costs from retail prices	Asks that RBOCs subtract only costs actually "avoided"
Cost of unbundled network elements	Insists that RBOCs use TSLRIC* accounting	Is willing to pay prices that include RBOCs' embedded costs
Local number portability	Insists on full database portability, as is the case with 800 numbers	Temporarily accepts call forwarding between two numbers
Interconnection negotiations	Expects to go to state arbitration with all RBOCs	Has already voluntarily signed deal with Ameritech

TSLRIC = Total Services Long-Run Incremental Costs, a system that only includes future costs of maintaining network elements, not past or embedded costs of building them.

from mandating a uniform national standard for interconnecting competitors' local net-

an accounting system that prevents RBOCs from charging wholesale fees based on past

Oracle

Continued from page 6

Hewlett-Packard Co. and Novell, Inc., will add Web clients and beef up support for 'Net protocols throughout the year.

When it ships next month, InterOffice will include support for Microsoft Corp.'s Messaging API and Post Office Protocol 3, as well as a Simple Mail Transport Protocol gateway for exchanging messages and attachments across the Internet. InterOffice will also support HTML and HyperText Transfer Protocol, allowing information to be published directly to a Web server.

Users will be able to choose among Windows 95, Web, Macintosh or Unix clients, and the software will run on Windows NT and Unix servers.

InterOffice has evolved over the years from its existing electronic mail software and Oracle Documents, a proposed Lotus Development Corp. Notes killer that never saw the light of day (see graphic, page 6).

Though the company stumbled in this space, Oracle has timed its entry to the client/server messaging and groupware arena just right for some customers.

Coris, a subsidiary of R.R. Donnelly & Sons Co. in Willowbrook, Ill., used the document management component of InterOffice to build a publishing system that can extract specific information from a relational database and publish it to CD-ROM or the Web.

"We are doing things like seasonal catalogs, and we have to pull out all this specific information," said Alex Kormushoff, vice president of marketing and client ser-

vices at Coris. "We looked at other products, and we feel that this gives us the best hooks to our data."

In addition to supporting 'Net protocols out of the box, InterOffice uses an Oracle7 database as its back-end repository. This provides the security, scalability and accessibility that is currently lacking in most client/server messaging software, said John Bartlett, senior director of product marketing at Oracle.

However, analysts said InterOffice will be less adaptable than products such as Notes and GroupWise because its core features are encoded in the company's database.

Analysts said Oracle's real challenge is how to push InterOffice in an already crowded client/server messaging arena where it has an installed base of fewer than 700,000 users.

On the plus side, Oracle "can connect

to a database, has a comfort level with CIOs and has lots of sales reps pounding the pavement," said Ian Campbell, an analyst at International Data Corp. in Framingham, Mass.

"Still, [Oracle] is the fourth horse in what is probably only a two-horse race between Microsoft and Lotus," said Campbell.

InterOffice pricing is not yet available.

© Oracle: (415) 506-7000.

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Key Presenters: Craig Benson, *Cabletron Systems*; Marshall Rose, *Dover Beach Consulting*; and John McConnell, *McConnell Consulting*

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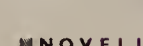
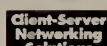
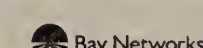
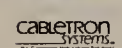
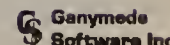
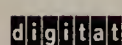
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Internet politics: The CDA is dead, but was it chicanery or incompetence?

Good-bye, Communications Decency Act. And good riddance. We hope. As you probably have heard by now, a federal appeals court killed the CDA on the grounds that it was unconstitutional. A three-judge panel ruled: "As the most participatory form of mass speech yet developed, the Internet deserves the highest protection from government intrusion."

The panel continued: "The CDA is patently a government-imposed content-based restriction on speech, and the speech at issue, whether denominated 'indecent' or 'patently offensive,' is entitled to constitutional protection. . . Just as the strength of the Internet is chaos, so the strength of our liberty depends upon the chaos and cacophony of the unfettered speech the First Amendment protects."

Hallelujah.

So, four months after Mr. Clinton signed the act, we find that the government apparently didn't understand the Constitution. Am I missing something here?

Did Slick Willie and his merry band think they could just slide in a flagrantly unlawful piece of legislation and get away with it? If they did, it is a sad reflection on our political system that, as public servants, they believed they could abuse their power with impunity. (Pssst. Bill, does the name Nixon mean anything to you?)

On the other hand, if they didn't know that what they were trying to do was unconstitutional, then their actions smack of incompetence and ignorance. Surely someone in the White House could have conferred with someone who could have advised them from a position of knowledge on the implications of the proposed Communications Decency Act?

So either the White House was being duplicitous or they were incompetent. Hmmm. Tough choice.

I favor duplicitousness. I think that the novelty of the Internet and the ease with which a small aspect of the 'Net could be singled out and magnified makes the online world a sitting duck for political target practice.

Let's face it, the Communications

The CDA has nothing to do with decency and everything to do with brownnosing the Washington power structure.

Decency Act has nothing to do with decency and everything to do with brownnosing the Washington power structure and picking on a rabble-rousing topic to appease a group of right-wing senators with more voting clout than intelligence.

The problem with the Internet is that in being new, vibrant and somewhat anarchic, it is a great resource for those who are looking for windmills to tilt at. It is quite easy to find a small area of something you don't like online and amplify its evils to those who are uninformed, unthinking and ready to be outraged by things they have no real concept of.

The demonization of the Internet — and, by association, the major online services — as the virtual equivalent of porno shops and as rabid seducers and corrupters of the young and impressionable was a cheap and shameful piece of political skulduggery. And it was unworthy of those who are supposed to understand and manage our culture.

Let's just consider what this implies for the future. I suspect that the government will appeal the decision, but that it will be a low-profile project and the decision will ultimately stand. After that, it will be hands off the 'Net with regard to porn for at least two years. But within the next 12 months, the ugly specter of the need for the feds to intercept and decode Internet messages will raise its superannuated head.

As Sen. Barry Goldwater once said, "We need the government off our backs, out of our pockets and out of our bedrooms." To that we can now add, "and off the Internet."

Is the Internet really that in need of control? Send your plans for world, or at least 'Net, domination to mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504.



Mark Gibbs

How IBM won a client by not selling 12,000 LAN servers

A few weeks ago, I wrote of a crisis facing Olympic-bound spectators: where to find public toilets. The city of Atlanta and the Olympic Committee had decided to do more with less and let visitors fend for themselves.

I'm pleased to report that a wealthy businessman said he will donate \$1.5 million to pay for portable toilets and water fountains during the Games. I can already hear sighs of relief — from native Atlantans, of course.

The "less is more" mantra is quite popular. But imagine my surprise upon learning that IBM just advised a big prospect to not buy 12,000 PC servers. Instead, IBM is selling its customer 60 small

Dave Buerger



Unix-based servers.

Is IBM nuts? This action seems akin to General Motors offering to sell 60 buses instead of 12,000 cars, or Secretary Donna Shalala saying, "We want to do our fair share to cut the federal budget, so Health and Human Services will lay off staff, close most of our local welfare offices and handle business from a few regional locations."

Is IBM nuts? This action seems akin to General Motors offering to sell 60 buses instead of 12,000 cars.

IBM is crazy — like a fox. Let's not fool ourselves. Of course Big Blue would have preferred selling 12,000 servers. Chucking \$150 million in revenue shows that IBM seriously wants to please its prospect. Or beat out a rival vendor.

The buyer is an insurance company with 48,000 agents in 12,000 branch offices. An average of four agents are located in each branch. Each agent was to use a networked application for booking new business. The transactions would be uploaded to the enterprise data center nightly.

A client/server solution seemed obvious. But the real question was what kind of client/server design would work best.

Arch-rival Microsoft Corp. had proposed 12,000 low-end Windows NT servers, one for each branch office. IBM countered with a regional server solution

using 60 AIX/6000 Unix-based application servers, each supporting 800 users in 200 branches within its region. Microsoft said its idea would cost less.

IBM's director of competitive technology software solutions, John Shedletsky, said he was tired of hearing Microsoft's "costs less" pitch and decided to study the true cost of consolidating servers into regional centers, much like users have done with mainframes.

The analysis relied on Gartner Group, Inc.'s five-year cost-of-ownership model, including hardware, software, network infrastructure, communications, support and management. IBM added conservative assumptions for lost user productivity due to server downtime.

The results were head-turning. Managing the branch server solution would cost \$120 million per year. This presumed a cost of \$10,000 per server, which is on the low end of Gartner's scale. The regional solution would cost 200 times less — roughly \$600,000 a year.

The cost of the server hardware and software was much less for the regional solution. Communications costs were higher, but could be controlled by using software such as XcelleNet, Inc.'s RemoteWare.

Downtime costs were 52 times lower for the regional solution, \$900,000 vs. \$47 million per year. The regional solution also could be more easily field upgraded, which would reduce the risk of failure.

One of the most intriguing items was the server size required to support the insurance company's application. A detailed analysis showed that the peak workload on a Pentium-based branch server would be just 4/10 of 1% processor utilization. Peak workload on a Pentium-based regional server would be 80%. The branch server solution was clearly overkill.

The insurance company is now prototyping IBM's plan.

Network managers would similarly do well to crank up the spreadsheet before buying any large system. The question is no longer one technology vs. another, but which combination of technologies will do more for less.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.

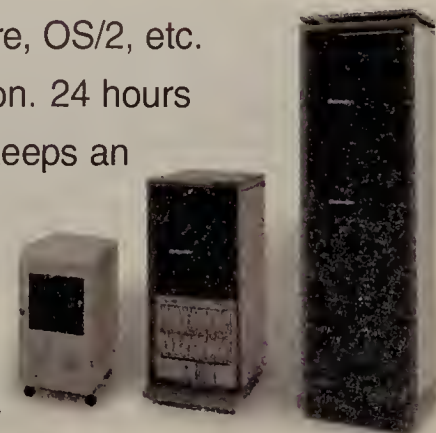


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9:00-5:30 Pre Conference Seminars: Using The Internet To Target Your Prospects - D. Radin, D. Kosoglow
Totally Unplugged: An In-Depth Look At Wireless Technologies And Business Applications, I. Brodsky
ISDN - The Basics And Beyond - T. Cross
The Glue At The Crossroads: Mobile, Wireless And The Internet - T. Schmidt

TUESDAY, SEPTEMBER 10, 1996

	Extending The Enterprise: Bringing The Corporate Network To New Locations	Working On The Web: Internet & Intranet Strategies	Mobile Solutions: Supporting The Unplugged Worker	Issues & Answers: The Latest Technologies
7:00-8:30	Conference Registration			
9:00-9:50	Event Chair Address: Power To The People: Rethinking Corporate Information Priorities - T. Nolle			
10:00-10:50	Chairmen's Addresses: Remote Access Infrastructure: Strategically Extending the Enterprise - V. Sribar Remote Enabling Applications: "The Holy Grail" - M. Rothman			
11:00 - 11:50	Chairmen's Address: Messaging On The Intranet: The Great Convergence - D. Blum and G. Rowe			
12:00-1:30	Lunch Break			
1:30-2:20	PANEL DISCUSSION Remote Control Vs. Remote Application Services Vs. Remote LAN Access Panel - J. Gallant	Using A Web Browser To Access Information - P. Byrne	PANEL DISCUSSION Wireless Access To The Internet - I. Brodsky	Videoconferencing: Do You Need Virtual Workers? - P. Moynahan
2:30-3:20	Advanced Services For Remote Access - T. Nolle	Lotus Notes And The Internet - A. Mahon	Authentication And Encryption - J. Geary	Intelligent Remote Access To Legacy Systems - T. Manocha
3:30-4:20	Telecommuting Cost Analysis & Organizational Mgmt. Issues - T. Cross	Intranets: The Future Of Collaborative Computing - G. Brooks	CDPD - The Mobile Answer? - T. Schmidt	Virtual Office: Options And Issues - N. d'Arbeloff

WEDNESDAY, SEPTEMBER 11, 1996

8:30-9:20	Selling Remote Access/Mobile Computing To Upper Management - T. Nolle	Firewalls And The Future Of Internet Security - G. Lebovitz	PANEL DISCUSSION New Technologies For Mobile Computing - T. Bajarin	PANEL DISCUSSION How Many Vendors? The Single- Source Dilemma - J. Gallant
9:30-10:20	Remote Access: The ISDN Solution - S. Kelly	Java And Wireless Communications - K. Wilson	PANEL DISCUSSION Wireless Data: Still Unplugging Away - B. Frezza	Data Collaboration Standards: The T.120 Story - N. Starkey
10:30-11:20	Keynote Presentation: Remote Access And The Virtual Corporation - C. Calisi			
11:30	EXPO OPENS			
12:00-2:00	Lunch Break & Visit the Expo Floor			
1:00-1:50	Technology Briefings			
2:00-2:50	Telecommuting: Taking IT Home - M. Kosanovich	The Internet Meets The Telephony World - D. Latham	Taking the Internet/Intranet Mobile - T. Schmidt	PANEL DISCUSSION Internet Telephony - B. Frezza
3:00-3:50	Expo Time			
4:00-4:50	Keynote Presentation: The Virtual Intranet For The 21st Century - D. DeAngelo			
5:00-6:00	Expo Time			

THURSDAY, SEPTEMBER 12, 1996

8:30-9:20	Remote Application Management - C. King	Dial Access To The Internet And Frame Relay/ATM Corporate Nets - P. Alexander	Extending Applications To The Edge Of Your Network - M. Santiago	PANEL DISCUSSION Notebooks: The Road Warriors' Ultimate Tool - B. Goldenberg
9:30-10:20	Keynote Presentation: Turning The Power Of The Web Inward: Intranets - J. Lindner			
10:30	EXPO OPENS			
11:00-11:50	Technology Briefings			
12:00-1:30	Lunch Break & Visit the Expo Floor			
1:30-2:20	Keynote Presentation: Supporting The Unplugged Worker With CDPD Services - B. Hirsh, pg 3			
2:30-3:20	Controlling The Cost Of ISDN Remote Access - G. Daniello	Remote And Mobile Computing On The Internet - S. Jajeh	Key Security Solutions - D. Morris	
3:30-4:30	Expo Time			
4:30	Closing Address			

FRIDAY, SEPTEMBER 13, 1996

9:00-5:30 Post Conference Seminars: Business Approach To An Internet Strategy - D. Shimberg
Migrating to ATM - A Technology Overview - H. Van Norman
Understanding The Java Phenomenon - D. Mezick, S. Hillier

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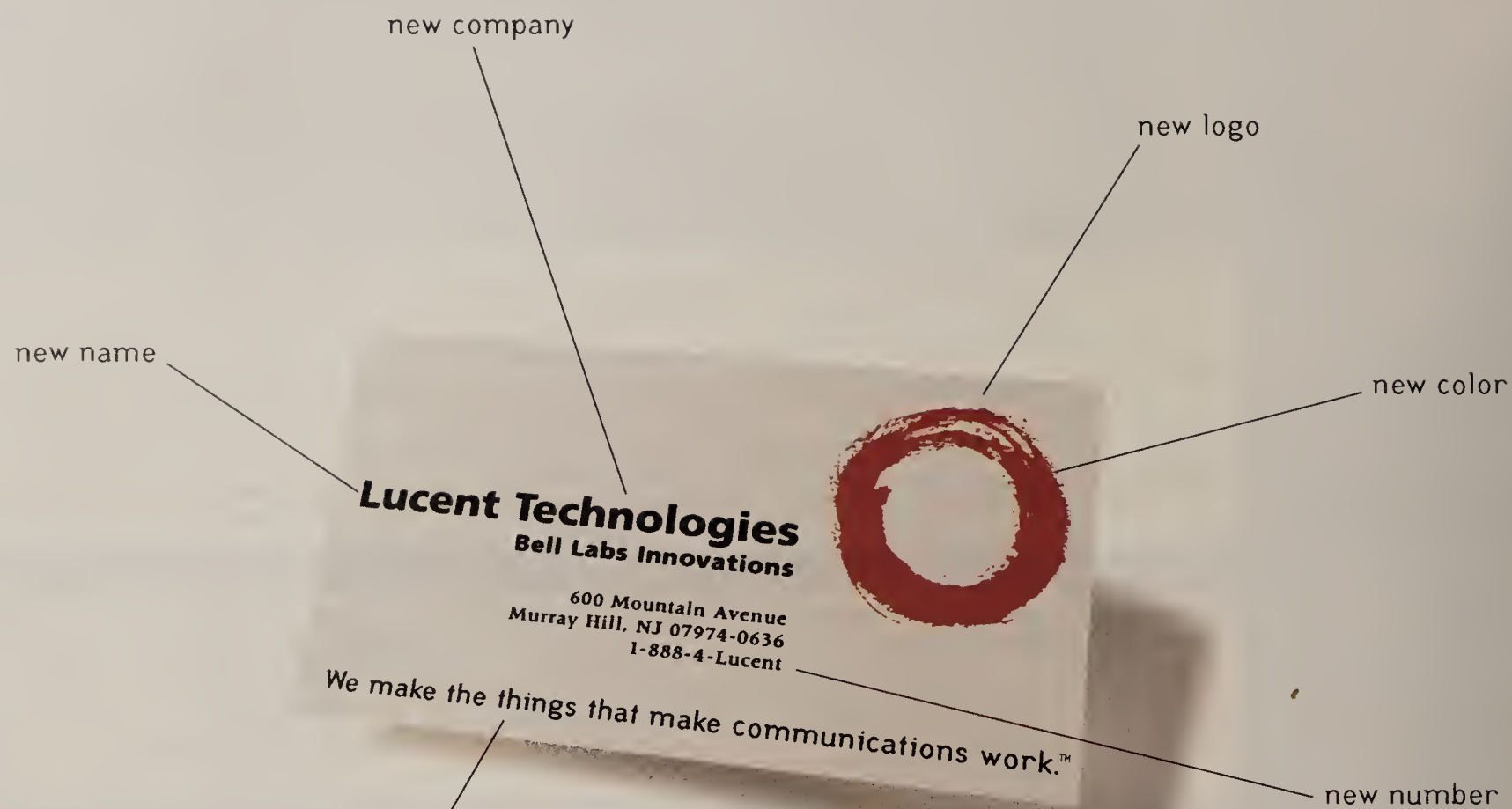
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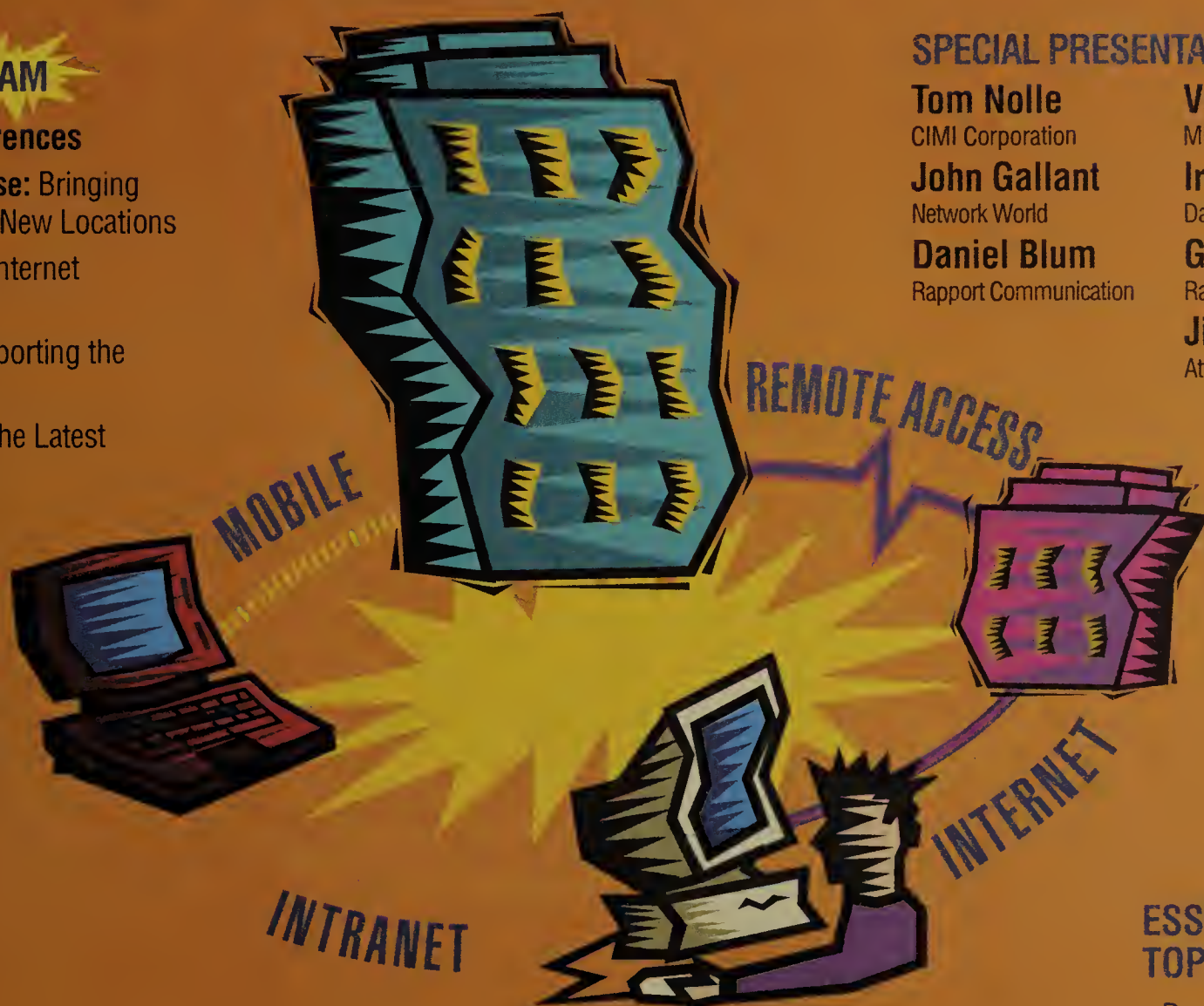
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Ira Brodsky
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If you're like most companies today, much of your contact with customers takes place in remote office locations. Over 70% of your sales territory expansion involves the addition of a small field office, often in the salesperson's home. Your business depends on people who sit at the very fringe of your company's network.

Based on these statistics, the most pressing information problem you have today is – *getting corporate information to the people who really need it*. Every company recognizes how impor-

tant information is to its workers, and NETWORK WORLD UNPLUGGED provides you with the knowledge and capability to get these workers, the small remote office worker and the "Road Warrior," connected better, easier and more cost effectively.

The four pivotal tracks are –

- 1 Extending the Enterprise: Bringing Corporate Networks to New Locations.** This track focuses on empowering remote branch offices and small office, home office (SOHO) workers.
- 2 Working on the Web: Internet & Intranet Strategies.** If you want to get the most out of the Internet in supporting remote sites and mobile workers, or build your own Internet- like corporate information network, this track's for you!
- 3 Mobile Solutions: Supporting the Unplugged Worker,** deals with the REALLY unplugged, the mobile worker who must rely on public dial facilities or even wireless technology.
- 4 Issues and Answers: The Latest Technologies.** A variety of fast-paced head-to-head debates between industry experts and vendors on what's best in remote access and futuristic technology presentations that will take you over the edge.

NETWORK WORLD UNPLUGGED is the only industry conference dedicated to the problems of remote and mobile access to corporate information. Here's a small sample of the topics covered:

- Want 128 kbps of remote access bandwidth? ISDN may be your answer. With data compression, ISDN can offer your remote workers as good a connection to corporate information as some LANs provide.
- Looking for a new approach to building corporate information distribution applications? Sun Microsystems' Java language lets your software run on PCs, UNIX workstations, and Macs. Applications can be stored on your servers and downloaded as needed.
- Is your remote access opening a door to your private resources that anyone can walk through? Security and firewalls are a critical part of remote access, but one that is all too often ignored.
- Are Internet tools like HTML and Web browsers an effective way of distributing information? We'll talk about the policy issues and the tools you can use.
- How are you going to manage all of this? Networks that can't be supported can't be used. We'll talk about management systems and policy issues to help you get the most out of the technology and services you buy.

CHECK OUT THE INSIDE BACK COVER FOR MORE DETAILS!